Fourth Five-Year Review Report

for the

U.S. Aviex Superfund Site
Niles and Howard Townships, Cass County
Michigan

Prepared by

U.S. Environmental Protection Agency
Region 5
Chicago, Illinois

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Date 11/24/2014

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TABLE OF CONTENTS

Appendix A

Tables

Table 10 – Site Chronology

Appendix B

Figures

Figure 1 – Site Location Overview Map
Figure 2 – Site Location Map
Figure 3 – Site Feature and IC Map
Figure 4 – Site Survey Map of Affected Area for ICs
Figure 5 – Groundwater Flow Regime for Site Property
Figure 6 – Groundwater Flow Regime for Study Area
Figure 7 – Site Analytical Results for October 2012
Figure 8 – Site Analytical Results for May 2012
Figure 9 – Site Analytical Results for October 2013
Figure 10 – Study Area Analytical Results for May 2013
Figure 11 – Study Area Analytical Results for October 2013
Figure 12 – Cross-Section of Plume Depths in Select Monitoring Wells
Figure 13 – Diagram of Site Removal Activity Locations

Tables

Table 6 – Monitoring Well Points and Sampling Frequencies
Table 7 – Static Water Level Measurements and Well Construction Summary
Table 8 – Groundwater Cleanup Criteria and Maximum Detected Levels
Table 9 – Monitored Natural Attenuation Screening Parameters

Attachments

Attachment 1 – Grant of Easement to MDEQ for Site Access
Attachment 2 – Declaration of Restrictive Covenant and Easement for Site Parcels
Attachment 3 – Quitclaim Deed for Transfer of Site Property
Attachment 4 – Howard Township Zoning Ordinance
Attachment 5 – City of Niles Well Head Protection Area Zoning Ordinance
Attachment 6 – Public Notice Announcing Five-Year Review
Attachment 7 – List of Documents Reviewed for Five-Year Review
Attachment 8 – FYR Site Inspection Checklist and Photograph Log

LIST OF ACRONYMS

AOC	Administrative Order on Consent
ARAR	Applicable, Relevant and Appropriate Requirement
AWQC	Ambient Water Quality Criteria
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
COCs	Chemicals of Concern
DCA	Dichloroethane
DCE	Dichloroethylene or Dichloroethene
DCFM	Dichlorofluoromethane
DEE	Diethyl ether
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
EW	Extraction Well
FCOR	Final Closeout Report
FR	Federal Register
FS	Feasibility Study
gpm	Gallons per Minute
IC	Institutional Control
MCL	Maximum Contaminant Level
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MGD	Million Gallons per Day
MW	Monitoring Well
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
P&T	Pump-and-Treat
PCE	Perchloroethylene or Tetrachloroethylene
PCOR	Preliminary Closeout Report
ppb	Parts per billion or µg/L (water) and µg/kg (soil/sediment)
ppm	Parts per million, or mg/L (water) or mg/kg (soil/sediment)
PRPs	Potentially Responsible Parties
QAPP	Quality Assurance Project Plan
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
RI	Remedial Investigation

ROD	Record of Decision
RP	Responding Party
RPM	Remedial Project Manager (EPA)
SARA	Superfund Amendments and Reauthorization Act of 1986
SDWA	Safe Drinking Water Act
TBC	To Be Considered
TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene
TCFM	Trichlorofluoromethane
UU/UE	Unlimited Use/Unlimited Exposure
VI	Vapor Intrusion
VIGSL	Vapor Intrusion Groundwater Screening Levels
VOC	Volatile Organic Chemical
WHPP	Well Head Protection Plan
WHPA	Well Head Protection Area

EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency (EPA), in consultation with the Michigan Department of Environmental Quality (MDEQ), has completed the fourth Five-Year Review (FYR) at the U.S. Aviex Superfund Site ("Site") in Niles and Howard Township, Cass County, Michigan. The purpose of a FYR is to review information to determine if a remedy is and will continue to be protective of human health and the environment. The triggering action for this statutory FYR at the Site was the completion of the third FYR report on November 24, 2009.

The U.S. Aviex Company produced non-lubricating automotive solvents. During the 1960s and/ or 1970s, it released chlorinated hydrocarbons to the soil and groundwater, which created a groundwater contaminant plume that affected nearby residential wells. In July 1972, an underground pipeline containing diethyl ether (DEE) ruptured, further contaminating the groundwater and nearby residential wells. In November 1978, a fire destroyed the facility and caused the release of organic compounds into on-site soil and groundwater.

EPA placed the Site on the National Priorities List (NPL) in September 1983. At that time, U.S. Aviex began pumping and treating groundwater from two extraction wells in an effort to contain the groundwater contaminant plume. EPA issued a Record of Decision (ROD) in 1988. The ROD called for soil flushing, pumping and treating groundwater, and implementing institutional controls (ICs) to restrict groundwater use. In 1993, EPA issued an Explanation of Significant Differences (ESD) to remove the soil-flushing component of the 1988 ROD after determining that the Site soil did not pose a significant threat of further contaminating the groundwater.

In 2004, EPA issued a ROD Amendment that called for discontinuing the groundwater pump and treat component and for installing an on-site ozone sparge system instead. The 2004 ROD Amendment also called for conducting a monitored natural attenuation (MNA) effort on the off-site groundwater contaminant plume and updated the Site groundwater cleanup goals. MDEQ began conducting operation and maintenance tasks and the MNA effort upon completion of remedy construction. In March 2012, MDEQ recorded certain activity and use restrictions on the land parcels comprising the Site and then released the property for redevelopment.

Upon review, EPA found the remedy to be currently protective of human health and the environment in the short-term. All residents who were potentially at risk have been connected to the municipal water supply and no exposure to groundwater contamination is occurring. Effective and enforceable ICs that prohibit certain uses and activities at the Site (e.g., groundwater use), have been implemented on the land parcels comprising the Site property. There are, however, some long-term concerns that need to be addressed at off-site areas in order for the remedy to be protective in the long-term. First, the proper recording of activity and use restrictions on two off-site land parcels to prohibit the potable use of groundwater needs to be verified. Second, as groundwater studies conducted since the last FYR indicate that the MNA remedy may not be effectively stabilizing the off-site, down-gradient plume, expanded groundwater monitoring and evaluation are needed to determine the appropriate follow-up measures to stabilize the plume and/or intercept it. And third, long-term stewardship procedures need to be developed and incorporated into an institutional controls implementation and assurance plan (ICIAP) or other equivalent document.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: U.S. Aviex		
EPA ID: MID980794556		
Region: 5	**State:** MI	**City/County:** Niles/Cass

SITE STATUS	
NPL Status: Final	
Multiple OUs? No	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: U.S. EPA
Author name (Federal or State Project Manager): Sheila A. Sullivan, RPM
Author affiliation: U.S. EPA Region 5
Review period: 11/27/2013 - 11/24/2014
Date of site inspection: 11/13/2014
Type of review: Statutory
Review number: 4
Triggering action date: 11/24/2009
Due date: 11/24/2014

Issues and Recommendations Identified in the Five-Year Review:

OU(s): OU1 and Site wide.	**Issue Category: Remedy Performance**
	Issue: There are limited lines of evidence that MNA is effective at the Site. Contaminant attenuation is inadequate and the DEE plume is not stable.
	Recommendation: MDEQ should develop a contingency plan for mitigating the ineffectiveness of MNA at the Site. The plan should list the factors that are triggering the plan; outline a decision matrix to be used to respond to the triggering circumstances; identify the technology(s) that will be utilized; and include a schedule for undertaking contingency measures.

Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	State	EPA	9/30/2015

Five-Year Review Summary Form (cont.)

OU(s): OU1 and Site wide.	**Issue Category: Remedy Performance**			
	Issue: Additional groundwater monitoring wells are needed between the western plume boundary and the Niles municipal well field.			
	Recommendation: MDEQ should install additional monitoring wells between the western plume boundary and the Niles municipal well field to evaluate the implications of DEE impacts on the municipal well field.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	9/30/2015
OU(s): OU1 and Site wide.	**Issue Category: Remedy Performance**			
	Issue: Residences in the Site area that use irrigation wells or those with wells at the leading edge of the groundwater contaminant plume have not previously been investigated or sampled.			
	Recommendation: MDEQ should contact the residents whose wells have not previously been investigated or sampled so that they may be sampled. They should also be added to the Berrien County drinking water well sampling program. Similarly, information distribution and coordination of private well sampling for the properties within the plume that historically refused connection to the municipal water supply should be continued.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	9/30/2015
OU(s): OU1 and Site wide.	**Issue Category: Institutional Controls**			
	Issue: Procedures should be developed and implemented to ensure that required ICs are effective and properly maintained, monitored, and enforced.			
	Recommendation: Develop an ICIAP or develop and incorporate equivalent long-term stewardship procedures and protections into the Site Operations and Maintenance Plan(s).			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	9/30/2015

Five-Year Review Summary Form (cont.)

OU(s): OU1 and Site wide.	**Issue Category: Institutional Controls**			
	Issue: Lack of verification of the proper recording of Declarations of Restrictive Covenant and Grant of Environmental Protection Easements (DRCs) for two residences located on Carberry Road and Marshlyn Drive.			
	Recommendation: Proper recording of the two off-site DRCs with the Cass County Register of Deeds needs to be ensured.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	6/30/2015

Protectiveness Statement

Operable Unit:	*Protectiveness Determination:*
OU 1 and Site wide	Short-term Protective

Protectiveness Statement:

This FYR found the remedy to be currently protective of human health and the environment in the short-term. All residents who were potentially at risk have been connected to the municipal water supply and no exposure to groundwater contamination is occurring. Effective and enforceable ICs that prohibit certain uses and activities at the Site (e.g., groundwater use), have been implemented on the land parcels comprising the Site property. There are, however, some long-term concerns that need to be addressed at off-site areas in order for the remedy to be protective in the long-term. First, the proper recording of activity and use restrictions on two off-site land parcels to prohibit the potable use of groundwater needs to be verified. Second, as groundwater studies conducted since the last FYR indicate that the MNA remedy may not be effectively stabilizing the off-site, down-gradient plume, expanded groundwater monitoring and evaluation are needed to determine the appropriate follow-up measures to stabilize the plume and/or intercept it. And third, long-term stewardship procedures need to be developed and incorporated into an ICIAP or other equivalent document.

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

EPA conducts FYRs pursuant to Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9621, and the National Contingency Plan (NCP). Section 121 of CERCLA states:

> *"If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."*

EPA interpreted this requirement further at 40 C.F.R § 300.430(f)(4)(ii), which states:

> *"If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such actions no less often than every five years after the initiation of the selected remedial action."*

EPA, in consultation with the Michigan Department of Environmental Quality (MDEQ), has conducted the fourth FYR on the remedy implemented at the U.S. Aviex Superfund Site in Niles, Cass County, Michigan. EPA is the lead agency for developing and implementing the remedy for the Site. MDEQ, as the support agency representing the State of Michigan, has reviewed all supporting documentation and provided input to EPA during the FYR process.

The triggering action for this statutory review is the completion date of the previous FYR report (November 24, 2009). The FYR is required because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE). This FYR is site-wide, as the Site consists of a single operable unit (OU).

EPA and MDEQ will place the completed FYR report in their respective records centers and at the local site information repository at the Niles District Library, 620 East Main Street, Niles, Michigan.

II. PROGRESS SINCE THE LAST REVIEW

EPA issued the third FYR report for the Site in November 2009 and determined that the remedy was protective of human health and the environment in the short term. Table 1 lists the protectiveness determinations/statements and Table 2 provides the status of the issues or recommendations.

Table 1: Protectiveness Determinations/Statements from the 2009 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1 (Site-wide)	Short-term Protective	The remedy at the U.S. Aviex Site currently protects human health and the environment in the short term. The implementation of ICs will ensure that the remedy remains protective in the long term. There is no current human exposure to contaminated groundwater or soil. The operation of the ozone/air sparge system and the excavation of vadose zone soils in the north area of the Site have removed contaminant source materials. In addition, residences with private wells situated within the plume and/or downgradient of the plume have been connected to the Niles municipal water supply, and their wells have been properly abandoned. The Niles municipal supply is not, nor is it expected to be affected by the Site-related groundwater contamination. Long-term protectiveness requires compliance with effective ICs. Evaluation of the necessity and types of ICs required is underway. To assure proper maintenance, monitoring, and enforcement of effective ICs, long-term stewardship procedures will be reviewed and a plan developed. A review of the need for an ESD for ICs will also be conducted. These steps are necessary to ensure that the remedy continues to function as intended and to ensure long-term protectiveness.

Table 2: Status of Recommendations from the 2009 FYR

OU #	Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Party	Original Milestone Date	Current Status	Completion Date (if applicable)
1 (Site-wide)	ICs have not been fully evaluated. A review of ICs is needed to ensure that the remedy is functioning as intended with regard to the ICs, and to ensure effective procedures, including measures to maintain, monitor, and enforce ICs, are implemented to assure long-term protectiveness at the Site.	IC evaluation activities are underway. An IC Plan will be developed to incorporate the results of the evaluation activities and plan for additional IC activities as needed, including planning for long-term stewardship and a review of the need for an ESD for ICs.	EPA/State	EPA	12/31/2010	Completed	3/5/2012

Recommendation 1

The 1988 ROD suggested that groundwater consumption advisories be used to achieve short-term protectiveness. This was accomplished by informing all property owners affected by the groundwater contamination of the associated risk from continued use of the groundwater. Many homeowners hooked up to the Niles municipal water supply at that time. With regard to long-term protectiveness, the ROD required that groundwater use be restricted through ICs because the timeline for achieving groundwater cleanup goals was estimated to be at least 20 years.

The 2009 FYR stated that ICs in the form of proprietary controls, particularly restrictive covenants for the Site property, should be evaluated. Additionally, since the groundwater plume had migrated beyond the Site boundaries, ICs in the form of governmental controls should also be evaluated. If it was determined that ICs are required to ensure long-term protectiveness of the remedy, then EPA and MDEQ would consider whether a remedy revision or clarification is necessary to document the need for ICs. The remedy for the Site may not allow for UU/UE and therefore, ICs would be necessary for long-term protectiveness.

Prior to September 2012, the State of Michigan owned the U.S. Aviex property, which consists of two parcels, and MDEQ maintained the property. In December 2003, as the grantor at the time, MDEQ had placed a Grant of Easement on each parcel to allow for its continued access and remediation of the Site (see Attachment 1). Subsequent ICs placed on the property, namely the Declarations of Restrictive Covenant and Grant of Environmental Protection Easement (DRC) filed on October 11, 2011[1] and recorded on March 5, 2012, grant MDEQ and its representatives access to the Site parcels in order to carry out response activities (see Attachment 2 for both DRCs). MDEQ placed activity and use restrictions on each of the two parcels of the property prior to releasing the property for redevelopment via the DRC. (See figure 1, which depicts the Site location and figures 2, 2A and 3, which illustrate the location of the parcels and the easements on the Site property).

The restrictive covenants cited in the DRC provide for the property to be used in accordance with the ordinances and zoning laws set forth by Howard Township. In September 2012, the State of Michigan transferred the property to AVX Properties, LLC in the form of a quitclaim deed for both parcels (see Attachment 3). Prior to the property transfer, it was zoned as Low-Density Residential. Subsequently, AVX Properties, LLC had the property rezoned to Light Industrial. The Howard Township Zoning Ordinance identifies the permissible uses of properties located within the Light Industrial district (see Attachment 4). Property-specific land use restrictions that are not otherwise identified by local land use limitations and zoning requirements are stated in pages 4-5 of each parcel's DRC in Attachment 3. The owner uses the property commercially to store boats and RVs.

In addition, DRCs and signage were drafted for two residential land parcels on Carberry Road and Marshlyn Drive. Among other things, the DRCs allow wells on the parcels to be used for irrigation after being connected to municipal water. The DRCs restrict the use of groundwater

[1] Parcel 1: Recorded on March 5, 2012, Liber No. 1038, Page 291, Cass County Register of Deeds (Tax ID No. 14-020-029-074-00). Parcel 2: Recorded on March 5, 2012, Liber No. 1038, Page 276, Cass County Register of Deeds (Tax ID No. 14-020-029-063-00).

from these wells to agricultural and irrigation purposes. Conditions for keeping the irrigation wells required that the respective property owners record the DRCs with the Cass County Register of Deeds.

Remedy Implementation Activities

Institutional Controls

Since the 2009 FYR, MDEQ has conducted several remedial activities, some of which were discussed above. The main activity since the 2009 FYR concerned the determination to enact effective and enforceable ICs. The parties accomplished this by recording the DRC on March 5, 2012. Table 3 summarizes the details of the implemented ICs.

Table 3: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Document	IC Objective	Title of IC Instrument Implemented and Date
U.S. Aviex Property On-site Groundwater: The Site land parcels do not support UU/UE based on the current concentrations detected in groundwater (See Figures 2 and 2A).	Yes	Yes	Restrict on-site groundwater use by prohibiting the installation of any wells for consumption of groundwater on the Site.	City of Niles Zoning Ordinance, Article 3, Section 327, Wellhead Protection Area, June 2000 (Attachment 5). Declarations of Restrictive Covenant and Grant of Environmental Protection Easement, March 5, 2012 (Attachment 2).
U.S. Aviex Property Off-site Groundwater: The off-site areas do not support UU/UE based on the current concentrations detected in the groundwater (See Figures 2 and 2A).	Yes	Yes	Prohibit groundwater use until cleanup goals are achieved; prevent the drilling or alteration of new water supply wells in the off-site impacted areas; and prevent interference with monitoring wells in the area and other components of the remedial action where there is groundwater contamination.	City of Niles Zoning Ordinance, Article 3, Section 327, Wellhead Protection Area, June 2000 (Attachment 5). DRCs for two residences on Carberry Road and Marshlyn Drive. (planned)
U.S. Aviex Property On-site Soils: Area of soil treated to industrial cleanup standards (See Figures 2and 2A).	Yes	No	Prohibit residential use of the Site; prohibit excavation or other activities involving disturbance of soils between 750 feet above mean Sea level (MSL) and 740 feet above MSL on the property unless conducted according to applicable state and federal environmental and health and safety laws and regulations.	Declarations of Restrictive Covenant and Grant of Environmental Protection Easement, March 5, 2012 (Attachment 2).

U.S. Aviex Property Remedy Components (See Figures 2 and 2A.)	Yes	Yes	Prevent interference with remedy components and related activities including operation and maintenance (O&M), monitoring natural attenuation, or other measures to ensure the effectiveness and integrity of the remedy in the ROD, ROD Amendment, and other decision documents.	Declarations of Restrictive Covenant and Grant of Environmental Protection Easement, March 5, 2012 (Attachment 2).

Following the implementation of the DRC, EPA issued a Site-wide Ready for Anticipated Use (SWRAU) determination on January 29, 2013. The criteria for a SWRAU determination are: 1) all cleanup goals in the ROD or other decision documents have been achieved for any media that may affect current and reasonably anticipated future land uses, so that no unacceptable risks remain; and 2) all institutional or other controls required in the ROD, or identified as part of the response action to help ensure long-term protection, have been put in place.

Two properties located on Carberry Road and Marshlyn Drive, respectively, use private wells only for irrigation purposes. Under the terms of an agreement with MDEQ, the residences were connected to the Niles municipal water supply at no cost, but the property owners were required to implement restrictions on groundwater use. As of the time of this FYR, MDEQ has not verified whether these DRCs are in place, and/or whether annual certification requirements have been developed and, if necessary, enforced.

To date, the ICs have been effective. No notable enforcement-related issues or IC breaches have occurred. The DRC is enhancing the protectiveness of the remedy, which is expected to continue over the long term. Fact sheets are provided to the area residents, and local government officials are expected to keep the community apprised of the progress of the remedial action and assist in notifying the community of Site conditions. Fencing and warning signs are in place and all access points are locked when personnel are not on-site.

It should be noted that since June of 2000, the City of Niles has employed a Wellhead Protection Plan (WHPP) to prevent existing and potential sources of contamination from reaching the public water supply or well field. The city elected to develop a Wellhead Protection Area (WHPA) "overlay zoning district." The use of a zoning "overlay" district in the city's zoning ordinance was to protect water quality, to keep pollutants from entering surface and groundwater, to reduce the danger of contamination, and to protect potable water supplies (see Attachment 5).

Long Term Stewardship

Since compliance with ICs is necessary to assure the protectiveness of the remedy, planning for long-term stewardship is required to ensure that the ICs are maintained, monitored and enforced so that the remedy continues to function as intended. Long-term stewardship involves assuring effective procedures are in place to properly maintain and monitor the Site. An ICIAP or an equivalent document should be developed and implemented to ensure that existing ICs and long-

term stewardship (LTS) procedures are in-place and effective. The purpose of the ICIAP is to conduct additional IC evaluation activities to ensure that the implemented ICs are effective, and to ensure that LTS procedures are developed and in-place so that ICs are properly maintained, monitored, and enforced. Long-term protectiveness requires compliance with the ICs.

LTS plans and procedures will be reviewed by EPA to ensure that the LTS procedures are clear. Long-term protectiveness requires continued compliance with the activity and use restrictions to ensure that the remedy continues to function as intended. LTS will ensure that the ICs are maintained, monitored and enforced. Plans such as an LTS plan or O&M plans should include the mechanisms and procedures for inspecting and monitoring compliance with the ICs, as well as communications procedures, including exploring the use of the one-call system. An annual report should be submitted to EPA to demonstrate: 1) that the Site was inspected to ensure no inconsistent uses have occurred; 2) that ICs remain in place and are effective; and 3) that any necessary contingency actions have been executed. Results of IC reviews should be provided to EPA annually and with a certification that the ICs remain in-place and are effective.

Remedial and Outreach Activities

MDEQ conducted the following remedial and outreach activities over the past five years:

- MDEQ coordinated with Berrien County and the City of Niles to update water well records and revise the proposed residential sampling program completed by the county. In support of this effort, the MDEQ drafted an updated fact sheet and prepared a summary of property owners with private well(s). The summary identified any changes in ownership or private well status downgradient of the Site.

- MDEQ is in the process of drafting a letter to the city to summarize the exceedances of DEE aesthetic criterion (10 µg/L) in groundwater at sentinel wells WMW-10S and WMW-10D, and to describe the potential for the DEE plume to migrate. The letter will serve as notification to the city that the plume is not stable; however, the health-based criterion (3,700 mg/L) has never been exceeded. DEE's taste and odor thresholds are very low; hence, aesthetic impacts are realized at much lower concentrations than those that would present a health concern.[2]

- In April 2014, MDEQ conducted Vertical Aquifer Sampling (VAS) at the leading edge of the contaminated groundwater plume where DEE concentrations have been measured above aesthetic groundwater criteria. Four VAS borings (RLB-1, RLB-2, RLB-3 and RLB-4) were advanced to 170 feet below ground surface (bgs) at the Jerry Tyler Municipal Airport and groundwater samples were collected from between 75 to 170 feet bgs. MDEQ prepared a technical memorandum documenting the VAS activities and the results of the investigation. No VOCs were detected in the samples. Permanent monitoring wells will be installed at these locations to serve as new sentry wells. Figure 3 provides a Site and regional overview and Figure 4 depicts VAS locations.

[2] DEE is a mobile, very volatile, highly flammable liquid used as an inhalation anesthetic and as a solvent for waxes, fats, oils, perfumes and alkaloids. It is mildly irritating to skin and mucous membranes.

- MDEQ contractor, WESTON Solutions of Michigan, Inc. (WESTON), prepared a vapor intrusion (VI) analysis technical memorandum in November 2013 summarizing historical investigations at the Site and evaluating the potential for VI in the adjacent residential neighborhoods. The evaluation utilized historical borings and well information, groundwater chemistry data, hydrostratigraphic information, and residential construction designs (as available) to provide conclusions related to the potential for VI scenarios. The analysis indicated that VI is not a widespread concern at the Site.

- To evaluate VI risks at the Site, in late October 2014, MDEQ collected soil gas samples to characterize the extent of soil gas contamination at the property. The soil gas probes were installed using direct push boring methods. After equilibrating for a minimum of 24 hours, samples were collected via a six-Liter SUMMA™ canister or Bottle-Vac™. The samples are being analyzed by the State of Michigan's Environmental Laboratory. MDEQ anticipates that any risks associated with the VI exposure pathway at the Site would be negligible.

- MDEQ is preparing a technical memorandum summarizing the field methods and analytical results derived from the soil gas investigation at the Site. Soil gas analytical results will be evaluated and on-site soil gas conditions will be characterized. The analytical results will also be correlated to downgradient soil and groundwater conditions for interpolation of potential downgradient VI risks. Information to date suggests it is unlikely that VI is affecting downgradient residences. The report is expected to be completed in late 2015.

System Operation/Operation and Maintenance Activities

MDEQ has not operated the ozone/sparge treatment system for the contaminant source area since March 2007, therefore, there are no current O&M activities underway for active remediation systems. MNA, the remedy component set forth in the ROD Amendment, is ongoing. MDEQ and WESTON have been conducting groundwater monitoring at the Site on a regular basis in accordance with its Groundwater Monitoring Plan. Groundwater monitoring was conducted on an annual basis in June 2009, 2010 and 2011. In April 2012, MDEQ increased the monitoring frequency from annual to semi-annual sampling in April and October in order to reflect seasonal changes. MDEQ also added the following geochemical parameters to the sampling scheme in order to evaluate contaminant biodegradation and MNA as a viable long-term remedy:

- VOCs
- Methane, Ethane, Ethene
- Alkalinity
- Chloride
- Sulfate
- Chemical Oxygen Demand (COD)
- Total Kjeldahl Nitrogen
- Manganese (Dissolved)
- Manganese (Total)
- Iron (Dissolved)
- Iron (Total)

- Ammonia
- Nitrate + Nitrite
- Dissolved Organic Carbon (DOC)
- Total Organic Carbon (TOC)
- Biochemical Oxygen Demand (BOD), 5-Day
- Carbon Dioxide
- Sulfide (Total)

The revised sampling program is subject to change based on an annual review of groundwater monitoring results. The overall objectives of the Groundwater Monitoring Plan are to:

- Assess the concentration and migration rate of the contaminants of concern (COCs) in the groundwater;
- Evaluate the effect of remedial measures on source area constituents;
- Evaluate changes in groundwater quality and aquifer hydraulics; and
- Assess the potential migration of COCs into aquifers designated as Well-head Protection Areas (WHPAs) by the City of Niles through continued monitoring of the sentinel wells (WMW-9 through WMW-12D).

Locations for all of the on-site and off-site monitoring wells included in the groundwater monitoring network are depicted on Figure 3. The monitoring wells included in the U.S. Aviex monitoring well network, sampling method, sampling frequency are listed in Table 6. The wells from which static water level measurements are collected are presented in Table 7 of Appendix B.

Since the 2009 FYR, MDEQ has expended the following costs to conduct O&M and MNA activities.

Table 4: Costs Expended to Conduct MNA

Year	Contractor	Lab	State	Total
2014	$ 72,883.32	$ 42,397.00	$ 49,510.40	$ 164,790.72
2013	$ 86,161.85	$ 39,345.50	$ 4,131.18	$ 129,638.53
2012	$ 34,401.28	$ 16,922.00	$ 12,910.06	$ 64,233.34
2011	$ 46,439.00	$ 6,925.00	$ 3,704.49	$ 57,068.49
2010	$ 29,227.00	$ 6,731.00	$ 5,661.00	$ 41,619.00

Analytical costs increased in 2012 and 2013 due to additional conformational sampling, and in 2014 due to efforts to define the downgradient plume, as well as to conduct the additional soil gas sampling.

Miscellaneous

The current owner of the Site, AVX Properties, LLC, has improved the appearance of the Site. During a November 6, 2012 inspection of the Site, EPA Remedial Project Manager (RPM) Sheila Sullivan noted that the Site appeared to be in good condition and exhibited the following

changes or improvements:

- Trees and shrubs had been removed or trimmed along the fence line and around the warehouse, which opened up and improved the overall appearance of the Site;

- The roof, gutters, and foundation of the warehouse had been repaired and or improved to prevent the damage that was occurring from water leaking into the building; and

- The power pole located next to the mobile lab station was removed by the power company.

III. FIVE-YEAR REVIEW PROCESS

Administrative Components

The FYR began on November 27, 2013, when the MDEQ sent EPA a notice letter to begin planning and coordinating the FYR activities. EPA's RPM led the FYR and MDEQ's Project Manager assisted with the review.

The FYR consisted of the following components:

- Community Involvement;
- Document Review;
- Data Review;
- Site Inspection; and
- Five-Year Review Report Development and Review.

Community Notification and Involvement

Activities to involve the community in the FYR process were initiated with a meeting in September 2014 between the RPM and CIC for the Site. Notices were published in the local newspaper, the *Niles Daily Star*, on November 17, 2014 and November 20, 2014 (see Attachment 6). The public was invited to submit comments and concerns to EPA or the MDEQ. The results of the review and the report will be made available at the agencies' respective record centers and the Site information repository for the Site located at the Niles District Library, 620 East Main Street, Niles, Michigan.

Document Review

EPA reviewed relevant Site documents, such as the 1988 ROD, administrative orders, and groundwater cleanup criteria and risk-based levels to protect human health and the environment. Post-ROD documents such as the 1993 ESD, the September 2004 ROD Amendment, the 2009 FYR, and applicable EPA and MDEQ guidance were also reviewed. The comprehensive list of documents is included as Attachment 7.

Data Review

MDEQ conducted seven full rounds of groundwater monitoring in June 2009, June 2010, June 2011, April and October 2012, and April and October 2013. MNA evaluations were also conducted on the data sets collected in 2012 and 2013. MDEQ issued a VI screening assessment in 2013 and collected soil gas samples in late October 2014. The soil gas analyses were not yet available for this FYR. The groundwater results and VI screening assessment are discussed below.

Groundwater

MDEQ and WESTON sampled more than 40 monitoring wells during each event. Prior to sampling the wells, static water level measurements were collected from 59 monitoring wells in April/October 2012 and in April/October 2013. No free product was detected in any of the monitoring wells.

The groundwater data show that flow direction is primarily to the west-southwest as groundwater leaves the Site and then it shifts to the west-northwest as it flows through the broader Study Area (i.e., the combined Site property and downgradient areas), which is consistent with historical results. Representative groundwater flow conditions near the Site are depicted on Figure 5 for May 2013. The regional groundwater flow regime based on water level measurements is depicted in Figure 6 for May 2013.

Along with the use of the current groundwater analytical data, VAS data from the April 2005 and November 2005 investigations were used to determine contaminant contour lines. The following is a discussion of groundwater contamination on the Site proper and the larger Study Area. The VOC analytical results are compared both to health-based cleanup goals established in the 2004 ROD Amendment and Part 201 Aesthetic Drinking Water Criteria (see Table 8 of Appendix B).

Site Property

The distribution of contaminants observed during the 2012 and 2013 sampling events is consistent with historical data from the Site. Analytical results for select COCs for the October 2012, May 2013, and October 2013 monitoring events are depicted in Figures 7, 8 and 9, respectively. In general, on-site concentrations have decreased following source area remedial activities. Despite the effectiveness of the remedial activities, two areas of groundwater contamination located in the northwest and southeast corners of the Site continue to exceed health-based criteria for one or more COCs.

DEE concentrations exceed Aesthetic Drinking Water Criteria, and 1,2-DCA and VC concentrations are consistently above health-based criteria in monitoring well WMW-15, which is located on the northeast corner of the Site. Concentrations of COCs in WMW-15 have shown little variability since 2006. South of WMW-15, monitoring well E-60 has consistently showed 1,2-DCA levels at or below health-based criteria. Exceedances continued to occur in May 2013 (see Figure 8), but in October 2013, COC levels in wells in the northwest corner of the Site decreased to below criterion values (see Figure 9). Future monitoring will help determine whether this is a permanent downward trend.

In the southeast corner of the Site, monitoring wells WMW-7A, WMW-7B, and WMW-16 indicate another area of COC concentrations that exceed health-based criteria. Since 2003, concentrations of 1,2 DCA, 1,1,1-TCA, TCE, 1,1-DCE, and PCE have repeatedly exceeded health-based in monitoring wells WMW-7A and WMW-7B. Similarly, concentrations of PCE, TCE, and 1,1,1-TCA have been detected in monitoring well WMW-16 since 2006. Each of the monitoring wells showed a decline in COC levels during operation of the ozone/sparge system; however, concentrations generally rebounded to pre-remedial levels after the system was shut down.

Measurable free product was not detected during the 2012-2013 monitoring in the area north of the warehouse at the Site, which indicates that the soil excavation and removal action performed by the MDEQ in 2007-2008 successfully addressed it.

Study Area

Analytical results from select COCs from the May and October 2013 monitoring events are presented in Figures 10 and 11, respectively. Since 2003, downgradient of the Site, varying concentrations of 1,2-DCA, 1,1,1-TCA, and DEE have been detected in monitoring wells RL-1, RL-2, and RL-4. DEE concentrations have consistently exceeded Aesthetic Drinking Water Criteria (10 µg/L) in each of the monitoring wells. 1,2-DCA and 1,1,1-TCA concentrations are generally below health-based and aesthetic criteria in these monitoring wells with the exception of monitoring well RL-1, which has shown steadily decreasing concentrations of 1,2-DCA above health-based criteria.

Sentinel Monitoring Wells

Monitoring wells WMW-9 through WMW-12D (Figure 3), were installed to monitor the migration of the contaminated groundwater plume(s) upgradient of the City of Niles' WHPAs. Since 2003, VOCs had not been detected in any groundwater samples collected from the sentinel monitoring wells. DEE was detected in WMW-10D in June 2010; however, the concentration did not exceed the Part 201 Aesthetic Drinking Water criterion. During the April and October 2012 sampling events, DEE was again detected in WMW-10D and WMW-10S above Part 201 Aesthetic Criteria. The remaining sentinel wells (WMW-9, WMW-11S, WMW-11D, WMW-12S, and WMW-12D) did not show any Site-related COCs during the 2012 and 2013 groundwater monitoring events.

The DEE analytical results in monitoring wells WMW-10D and WMW-10S indicate that the Site-related DEE continues to migrate, but concentrations at this time would only present aesthetic issues, as all concentrations are below its maximum contaminant level (MCL) under the federal Safe Drinking Water Act.

MNA Assessment

The four rounds of groundwater sampling during 2012 and 2013 also included the measurement of MNA parameters, which are listed above in the O&M Section. The VOC results were also reviewed for the presence of COC daughter products, such as TCE, DCE, 1,2-DCA, VC, and

chloroethane. This assessment provides a line of evidence needed to demonstrate that natural attenuation is occurring.

One round of MNA parameter samples were collected from 17 monitoring wells in May 2003 as part of the analysis of remediation options for the on-site source area. Very low levels of chloroethane and VC had been sporadically detected during previous monitoring events, indicating that MNA may be occurring at the Site. Dissolved oxygen (DO) measurements and MNA parameters identified anaerobic conditions north of the warehouse. In order to evaluate the occurrence of natural biodegradation at the Site, three source area wells, along with ten upgradient, downgradient, and side gradient wells were assessed using EPA's 1988 preliminary screening for anaerobic biodegradation for both the May and October 2012 and 2013 sampling events. The results are presented in Table 9.

Preliminary screening of VOC and geochemical analyses provided limited to inadequate evidence that conditions are suitable for biodegradation of COCs in the groundwater. Further, conditions that promote the reductive dechlorination of PCE and TCE may not be appropriate for the degradation of DEE. Specifically, studies related to the biodegradation of methyl tert butyl ether (MTBE), a similar ether-bonded compound to DEE, have indicated that these compounds often persist in the environment, possibly because few microorganisms appear to be able to utilize ether-containing compounds as growth substrates. As a result, it is possible that the DEE in the groundwater would be better suited for aerobic co-metabolic degradation. In addition, the apparent migration of DEE towards the WHPA indicates that the plume is unstable, and is expanding beyond the previously delineated boundary.

Preliminary assessment of the upgradient, downgradient, and side gradient monitoring wells indicate that subsurface conditions within and outside of the contaminated groundwater plume are not inherently supportive of anaerobic biodegradation. Although concentrations vary between monitoring wells and sampling events, the geochemical indicators and water quality parameters are not within the ideal ranges for reductive dechlorination.

The following is a summary of the preliminary screening results for select geochemical indicators and their relationship to the likelihood of reductive dechlorination occurring at the Site:

• ORP and DO are measured routinely at all of the groundwater monitoring locations. Of the 49 monitoring wells that are sampled semi-annually, 22 of the wells had favorable conditions for ORP during one or more of the sampling events. Only five monitoring wells, located on the Site and at the leading edge of the plume, had DO concentrations conducive to the reductive pathway. Conversely, 15 monitoring wells of varying depth had DO concentrations that were greater than 5 mg/L. DO readings above 5 mg/L indicate the reductive pathway is not tolerated, but COCs may be readily oxidized.

• TOC levels for the aquifer were well below the ideal concentration (20 mg/L) to support the reductive pathway. The highest concentration of TOC detected during either sampling event was 5.9 mg/L. The lack of carbon (electron donors) in upgradient and side gradient wells suggests that naturally occurring carbon levels are low. Available carbon within the contaminated

groundwater plume is also low. The lack of carbon in the aquifer is not supportive of reductive dechlorination.

• During reductive dechlorination, the chlorinated hydrocarbon is used as an electron acceptor, not as a source of carbon, and a chlorine atom is removed and replaced with a hydrogen atom. As a result, native geochemical compounds such as oxygen and nitrate become competitors in electron transfer processes that generate energy for microorganisms. Reductive dechlorination will not occur in the presence of oxygen, nitrate, or readily reducible iron. Twenty of the monitoring wells contained nitrate concentrations that were either not detected, or below 1 mg/L, suggesting that approximately half of the monitoring wells contain nitrate at concentrations that would compete in the electron transfer process. In addition, DO measurements from 44 of the monitoring wells exceeded 0.5 mg/L, indicating that oxygen concentrations are high enough in the groundwater to hinder the reductive dechlorination process.

Based on the preceding summary, the contaminant plume behavior is generally characterized as Type 3 behavior. Type 3 plume behavior dominates in areas having inadequate concentrations of carbon, and concentrations of DO that are greater than 1 mg/L. Under these aerobic conditions, reductive dechlorination will not occur. The most significant natural attenuation mechanisms for PCE, TCE, and DCE will be advection, dispersion, and sorption. Type 3 behavior also occurs in groundwater that does not contain microbes capable of biodegradation of chlorinated solvents.

In addition to characterizing the plume based on preliminary screening results, other findings should be considered for evaluating MNA at this Site. Detections of DEE in sentinel wells WMW-10S and WMW-10D have increased since 2010 and currently exceed aesthetic criteria. These detections also indicate that the plume is unstable and may be infringing on the city's WHPA. Monitoring will continue in order to confirm or refute these observations. Further, the presence of contaminants in sentinel wells suggests that more active remediation may be needed.

Source removal and treatment at the Site have likely helped to reduce the contaminant mass, and, in fact, ozone/air sparge treatment was discontinued in 2007. The monitoring of contaminant trends indicate that concentrations have rebounded in several of the monitoring wells (WMW-7A, WMW-7B, and WMW-16).

The continued screening of MNA at the Site has shown that only limited evidence exists supporting the occurrence of biodegradation at the Site. Although contaminant concentrations appear to have decreased over time, the rate of attenuation may not be sufficient for addressing groundwater contamination at the Site. Further, the increased COC concentrations in the sentinel wells indicate that the DEE plume is not stable. As a result of these data, and as specified in the 2004 ROD Amendment, a contingency plan for mitigating these circumstances should be developed as discussed further in Section V.

Vapor Intrusion

MDEQ also conducted a Vapor Intrusion (VI) Screening Assessment to evaluate whether potential VI risks exist at the Site, and whether a VI investigation to further evaluate such risks is necessary.

Historical soil, soil gas, and groundwater data were evaluated against current VI screening levels to assess whether residual soil, soil gas, or groundwater contamination pose a potential VI risk. RI and pilot test data from 2003 were used as a worst-case comparison to pre-remedial concentrations. More recent groundwater sampling data were assessed to determine post-remediation changes in groundwater VOC concentrations.

Site Property

Evaluation of the 2006, 2007, and 2012 groundwater analytical results identified two areas on the Site that may require further VI investigation:

• Excavation and off-site disposal of soil contamination north of the storage building mitigated the presence of NAPL and reduced dissolved phase groundwater contamination, reducing the potential for VI risks/complete pathways in this area; however, elevated concentrations of 1,2-DCA and VC persist in groundwater near monitoring wells WMW-15 and WMW 14R, north of the storage building. Measured depths to groundwater in WMW-14R and WMW-15 were 23.30 bgs and 24.69 bgs, respectively in October 2012.

• The ozone/air sparge system that operated from 2003 to 2007 reduced dissolved phase source area concentrations in central and southeastern portions of the Site, consequently reducing the potential for VI risks/complete pathways. However, elevated TCE concentrations persist in the groundwater of monitoring wells WMW-7B and WMW-16 in the southeast corner of the Site. Measured depths to groundwater in WMW-7B and WMW-16 were 17.69 bgs and 17.37 bgs, respectively in October 2012.

The implementation of remedial actions and ICs has minimized risks from the VI pathway on the Site. The review of historical and recent analytical data confirms that VI is not a widespread concern at the Site, however, the persistence of TCE and 1,2-DCA in the southeast and northwest corners of the Site did warrant additional VI investigation, including soil gas sampling in late October 2014 to confirm that risks associated with the VI pathway are acceptable.

Study Area

Evaluation of the 2006, 2007, and 2012 groundwater analytical results for the Study Area downgradient of the Site did not identify areas warranting further VI investigation. No MDEQ Vapor Intrusion Groundwater Screening Levels (VIGSLs)[3] were exceeded in the 2012 samples. TCE and 1,2-DCA concentrations previously exceeded VIGSLs at two wells (86-2A and RL-8D) in the residential area downgradient of the Site; however, 2012 concentrations were below VIGSLs. In addition, the increased depth to impacted groundwater beneath the nearby residential neighborhood compared to the Site area reduces the potential for VI from VOCs emanating from groundwater. Figure 12 presents a cross-section developed from 2012 groundwater monitoring data. The contaminant levels and relative plume depths for on-site and off-site monitoring wells are depicted.

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[3] VIGSLs are established in the MDEQ *Guidance Document for the Vapor Intrusion Pathway* dated May 2013 for those VOCs considered to be COCs.

Hydrogeologic conditions and routine monitoring of the groundwater at the Site also indicate that the potential for VI in the residential area southwest of the Site property is minimal. As demonstrated by the 2003 VAS results for the Study Area downgradient of the Site, off-site groundwater impacts are relatively deep (approximately 50 feet bgs or greater) and shallow groundwater was not impacted. The groundwater VOC plume has migrated deeper within the aquifer as it has migrated westward. In addition, there are no strong upward hydraulic gradients that would facilitate the upward migration of the plume to shallower depths.

Site Inspection

The FYR site inspection was conducted on November 13, 2014. Intermittent lake-effect snow obscured some of the features at the Site. EPA's RPM, Sheila Sullivan, MDEQ Project Manager, Matthew Williams, and MDEQ Geologist, Jason Hendey were present. In addition, WESTON Project Manager, Daniel Liebau, was available via telephone. The purpose of the inspection was to assess the protectiveness of the remedy, including the condition of the Site itself, the surrounding land, and the ICs. During the inspection, the representatives discussed Site and community issues. The completed inspection checklist and photo documentation are provided as Attachment 8.

MDEQ and EPA began the inspection by viewing some of the off-site downgradient wells at the Jerry Tyler Memorial Airport. Eight MDEQ monitoring wells (WMW86-7, WMW-9, WMW-10S and 10D, WMW-11S and 11-D) are located on the airport property and serve as sentinel wells, defining the leading edge of the downgradient DEE plume. The more recently installed wells, WMW-10S and WMW-10D, are flush-mounted but were easily visible. The recent VAS boring locations RLB-2 and RLB-3 were also located. The older airport wells, such as MW 86-7 and WMW-9, are above-ground, and were found to be in good condition and secure. Also viewed was monitoring well cluster WMW-12S and WMW-12D.

The agencies also drove through the neighborhoods that have been affected by the off-site groundwater contamination. These areas include Lilac, Blanchard, Bame and Almaugus Streets, as well as the Hickory Hills subdivision, which is comprised of 42 properties bounded by Carberry Road and Marshlyn Drive on the east and west, and Kristine and Janellen Drives on north and south. Janellen Drive runs along the northern flank of the DEE plume. All residences affected or potentially affected by the plume are being tracked and monitored, as ownership of some properties has changed. Most residences were served by private wells and have since been connected to the Niles municipal water supply, as necessary. The residential wells are relatively shallow, extending to a depth of 40-50 feet bgs. The contaminant plume is at a depth of about 150 feet bgs.

The RPM walked the Site property and evaluated Site conditions. Numerous monitoring wells and one soil vapor extraction well were identified beneath the snow cover. All wells are flush-mounted and appeared to be in good condition. The remaining structures include a large cement block warehouse, also referred to as the Storage Building, with corrugated steel doors located toward the western property line. The warehouse footprint is approximately 14,875 square-feet and now houses boats and RVs for off-season storage. Two small light blue buildings, which housed the groundwater pump and treat apparatus also are located toward the center of the property. A large cement platform that formerly supported the air-stripping tower has been

demolished. Several flush-mounted monitoring wells are located throughout the Site, particularly along the southeastern corner and southern property line where TCE and TCA contamination was found at levels exceeding MCLs.

MDEQ indicated its plan to install eight additional monitoring wells onsite - three in the far northwest corner where 1,2-DCA and DEE contamination is present; one in the northeast corner where no wells are currently located; three in the southeast corner; and one in the southwest corner. There are no on-site contaminants from past and present activities that would be hazardous to trespassers. No signs of vandalism or tampering were evident. The cyclone fence was in good condition, except for two holes in the northwest area of the Site, which the owner is aware of and plans to repair. Signs are posted on the perimeter fencing identifying the property as a Superfund site. The two gates located respectively on the north and south perimeters of the Site are securely locked.

Interviews

Ms. Sullivan conducted several interviews during the November 13, 2014 inspection of the Site. The purpose of the interviews was to document any perceived problems or successes with the remedy that has been implemented to date. Interviews are summarized below and complete interviews are included in Appendix B.

While on site, Ms. Sullivan spoke with MDEQ representatives Matthew Williams and Jason Hendey about the status of municipal connections for residences downgradient of the Site, the plume migration, the protectiveness of the remedy, and future site investigation work. MDEQ indicated that the contaminant slug that initially traveled off-site prior to and during the earlier period of remediation, escaping the pump and treat system, is not showing strong signs of stabilization under MNA. The plume has moved westward beyond two sets of sentry wells, and MDEQ is currently planning a third line of wells based on the recent VAS borings. The plume is also traveling between two of the city's WHPAs to the north and south. The plume is closely tracked and monitored semiannually to ensure that concentrations do not exceed MCLs. Levels of 1,2-DCA along Lilac Avenue are decreasing and are being managed. Mr. Williams indicated that the potential for future groundwater contaminants to move off-site is being addressed. Of the few calls received by MDEQ from residents, they chiefly involve iron/rust issues. No other aesthetic complaints concerning taste and odor have occurred.

Following the inspection, Ms. Sullivan met with Jeff Dunlap, Utilities Manager for the City of Niles, Johnny Hall, Operator-in-Charge of the Niles Water Department, and Gregg Watson, Service Center Superintendent. The meeting was held at the Niles Water Filtration Plant located at 1815½ Eagle Street in Niles. Ms. Sullivan discussed the remedial progress at the Site and the downgradient DEE and DCA plumes. The city has seven production wells. Three of the wells are located in the WHPAs flanking the plume. Well #3 (Parker Well) is to the south, and Airport #1 and Airport #2 are to the north. Airport #2 is a new well commissioned earlier in 2014. Each of the wells pump close to one million gallons per day (MGD) for a combined withdrawal rate of about 2.8 MGD, which feeds into the iron filtration plant. The treatment includes aeration, detention and pressure filtration. The other four wells feed into the distribution system.

years of MNA, the plume contaminant levels appear to be declining, but the plume has not reached a steady state and is expanding beyond the previously delineated boundary, which is the current line of sentinel wells. The leading edge of the downgradient DEE plume shows increasing DEE concentrations. Preliminary assessment of the upgradient, downgradient, and side gradient monitoring wells indicate that subsurface conditions within and outside of the contaminated groundwater plume do not inherently support anaerobic biodegradation.

System Operations/O&M

As discussed, there has been no active on-site remediation since decommissioning of the ozone/air sparge system in 2007. O&M costs for MNA have increased over the past five years due to increased monitoring frequency and additional investigations to better characterize the plume and to determine the placement of new sentinel wells. In addition, MDEQ has undertaken VI screening, soil gas sampling and the assessment of VI risk. The 2004 ROD Amendment provides for contingency measures should the remedy not prove to be protective. Such measures may include implementing active remediation systems, which would raise the costs initially, but would presumably shorten the remediation and O&M timeframe.

Implementation of Institutional Controls and Other Measures

Several layers of ICs have been implemented both on-site and off-site over the years, which have proven to be effective and enforceable. In March 2012, a DRC was recorded involving the State of Michigan and the current property owner that prevents on-site groundwater use by prohibiting the installation of any wells for consumption of groundwater on the Site; prohibits residential use of the Site; and prohibits excavation or other activities involving disturbance of soils on the Site property as well as interference with remedy components, O&M activities, MNA and other measures that ensure the effectiveness of the remedy.

MDEQ has required that DRCs be recorded for two residential land parcels located on Carberry Road and Marshlyn Drive, which are connected to the municipal water supply for potable use, but use groundwater from their private wells for agricultural and irrigation purposes. Proper recording of the two DRCs with the Cass County Register of Deeds needs to be ensured. Long-term stewardship procedures need to be developed and incorporated into an ICIAP or other equivalent document.

The city's WHPA ordinance (see Attachment 5) also restricts groundwater use, prevents the drilling or alteration of new water supply wells in the off-site impacted areas, and prevents interference with monitoring wells and other components of the remedial action. Informational material such as MDEQ Fact Sheets, residential well monitoring results, and the city's annual water quality reports also inform the community of the existence of the off-site groundwater contamination.

Access controls, including perimeter fencing, secured gates, and posted warning signs are in place, maintained, and are effective in preventing exposure.

The city is required to monitor its wells annually for required parameters under the federal Safe Drinking Water Act, however, DEE is not one of the regulated parameters. No organic or Site-related contaminants have been detected. Ms. Sullivan also explained the health-based and aesthetic criteria for DEE—the high threshold for health effects as compared to the much lower threshold for taste and odor problems to occur, and the fact that the city wells were not in any imminent danger. The city was concerned that its Parker and Airport wells might be pulling the plume into its WHPAs, given the fact that these wells are screened at depths similar to that of the plume. The city indicated that the community is low-key and that it has received no Site-related complaints about drinking water, but has received a few complaints concerning rusty water and chlorine odor.

Mr. Hall clarified the city's responsibilities regarding water purveyance, well installation and local ordinances among the overlapping entities of the City of Niles, Howard Township and Cass County. He stated that while the city supplies water within the city limits, since wells were not allowed in those areas outside the city in Howard Township where the contamination had spread, the city extended its water lines into Howard Township. The city maintains an open dialogue with Howard Township and has a contract with the township for maintenance of water and sewer lines and the lift stations. Presently, all new homes in the city must connect to the municipal supply, and all existing homes that connect to the supply must properly abandon their wells. The city also stated that it would like to receive more frequent updates on the status of the Site cleanup.

Adam Christie of AVX Properties, LLC, the Site property owner, also met with Ms. Sullivan at the filtration plant. Mr. Christie raised some issues regarding connecting to the city water and sanitary sewer lines that run along Huntly Road. He also wanted some explanation about whether he could remove the two extraction well housings located on his property as per the DRC. Mr. Christie said that no Site-related issues have occurred, and that vandalism and trespassing are not issues or concerns. We also discussed the fact that the MDEQ is performing a VI analysis for the Site.

IV. TECHNICAL ASSESSMENT

Question A: *Is the remedy functioning as intended by the decision documents?*

No. The remedy is not functioning as intended, however, there are no current exposures to Site-related compounds. The 2004 ROD Amendment specified that the agencies would reconsider the remedy decision under a contingency plan that would be triggered after four or more rounds of groundwater monitoring data confirmed that contaminant levels are not declining or the contaminant plume increases significantly in areal or vertical extent. Although four years of consecutive monitoring events will not be achieved until 2015, the four seasonal monitoring events in 2012-2013 indicate the above conditions, i.e., the downgradient DEE plume is spreading, and the DEE levels are increasing.

The ROD Amendment also anticipated that the MNA component of the remedy would successfully decrease the contaminant levels in the off-site plume below applicable health based criteria within a 20-year time period. Presently, the MNA studies indicate that after about 10

Question B: *Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?*

No. Since the 2009 FYR, the land parcels comprising the Site were transferred from the State of Michigan to a private citizen who has set up a business that leases storage space on-site. The property was re-zoned from low-density residential to light industrial use. The zoning change would result in lower potential risk from exposures to on-site contaminants than residential use would. Further, recently implemented ICs ensure that no exposure to contaminated groundwater can occur via ingestion or dermal contact routes. However, VI has emerged as a potential exposure pathway to consider with respect to future protectiveness and thus, is currently being evaluated. There are no ecological concerns at the Site. No changes have occurred on-site that have affected remedial components or the current effectiveness of the remedy. There are no newly identified contaminant sources or unanticipated toxic byproducts that have not been addressed.

There have been no changes in toxicity factors or other COC characteristics that could affect the protectiveness of the remedy. Further, no revisions to cleanup criteria or other standards identified in the ROD Amendment have occurred that could affect the protectiveness of the remedy.

Changes in Risk Assessment Methods

The EPA's VI guidance has been evolving over the past decade and certainly since the time of the last FYR. These changes[4] do not affect the protectiveness of the remedy since VI has never been assessed at the Site until now. Another recent change in risk assessment methodology concerns the adaptation of the 2011 Exposure Factors Handbook to Superfund. Some of the default values (i.e., body weight and exposure time), have changed, shifting the screening levels to slightly less conservative values. These changes do not affect the validity of the remedy itself.

Question C: *Has any other information come to light that could call into question the protectiveness of the remedy?*

No. There is no additional information acquired through the FYR that calls into question the protectiveness of the remedy.

Technical Assessment Summary

The remedy is not functioning as intended by the decision documents, namely the 2004 ROD Amendment that modified the remedy from groundwater pump and treat to ozone/air sparging and MNA. COCs persist within the contaminant plume downgradient of the Site and are infringing on the city's WHPAs. The continued migration of DEE towards the city wells is

[4] Though EPA issued draft guidance for SVI in 2002, a 2009 report issued by the Office of Inspector General discounted the draft guidance for various reasons, namely the use of the oral pathway to extrapolate inhalation values. In 2010, Region 5 developed its own guidance, which recommended using only direct inhalation values as opposed to oral extrapolation-based values. An external review draft of the new "Final" VI Guidance from EPA headquarters was released in 2013, however this guidance has not been finalized.

evidence that the contaminant plume has not stabilized and is traveling beyond the sentinel wells. Further, there is limited to insufficient evidence that conditions are suitable for the biodegradation of plume contaminants.

O&M costs have increased over the past five years due to increased monitoring frequency and additional investigations to better characterize the plume and to determine the placement of new sentinel wells. In addition, MDEQ has undertaken VI screening, soil gas sampling and the assessment of VI risk. The ICs that are in place have been effectively preventing potential exposures to on-site and off-site groundwater contaminants. However, proper recording of the two off-site DRCs needs to be ensured. Long-term stewardship procedures need to be developed and incorporated into an ICIAP or other equivalent document.

The exposure assumptions used at the time of the remedy selection have changed, however this does not affect the protectiveness of the remedy. The property has been rezoned from residential use to light industrial use, which requires less stringent exposure assumptions.

There have been no changes in toxicity factors or other COC characteristics that could affect the protectiveness of the remedy. Further, no revisions to cleanup criteria or other standards identified in the ROD Amendment have occurred that could affect the protectiveness of the remedy.

No other unaddressed information has arisen that could potentially affect the protectiveness of the remedy.

V. ISSUES/RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 5: Issues and Recommendations/Follow-up Actions

Issues and Recommendations Identified in the Five-Year Review:				
OU(s): OU1 and Site wide.	**Issue Category: Remedy Performance**			
	Issue: There are limited lines of evidence that MNA is effective at the Site. Contaminant attenuation is inadequate and the DEE plume is not stable.			
	Recommendation: MDEQ should develop a contingency plan for mitigating the ineffectiveness of MNA at the Site. The plan should list the factors that are triggering the need to act; outline a decision matrix to be used to respond to the triggering circumstances; identify the technology(s) that will be utilized; and include a schedule for undertaking contingency measures.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	9/30/2015

OU(s): OU1 and Site wide.	Issue Category: Remedy Performance			
	Issue: Additional groundwater monitoring wells are needed between the western plume boundary and the Niles municipal well field.			
	Recommendation: MDEQ should install additional monitoring wells between the western plume boundary and the Niles municipal well field to evaluate the implications of DEE impacts on the municipal well field.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	9/30/2015

OU(s): OU1 and Site wide.	Issue Category: Remedy Performance			
	Issue: Residences in the Site area that use irrigation wells or those with wells at the leading edge of the groundwater contaminant plume have not previously been investigated or sampled.			
	Recommendation: MDEQ should contact the residents whose wells have not previously been investigated or sampled so that they may be sampled. They should also be added to the Berrien County drinking water well sampling program. Similarly, information distribution and coordination of private well sampling for the properties within the plume that historically refused connection to the municipal water supply should be continued.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	9/30/2015

OU(s): OU1 and Site wide.	Issue Category: Institutional Controls			
	Issue: Procedures should be developed and implemented to ensure that required ICs are effective and properly maintained, monitored, and enforced.			
	Recommendation: Develop an ICIAP or develop and incorporate equivalent long-term stewardship procedures and protections into the Site Operations and Maintenance Plan(s).			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	9/30/2015

OU(s): OU1 and Site wide.	Issue Category: Institutional Controls			
	Issue: Lack of verification of proper recording of DRCs for two residences located on Carberry Road and Marshlyn Drive.			
	Recommendation: Proper recording of the two off-site DRCs with the Cass County Register of Deeds needs to be ensured.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	6/30/2015

Protectiveness Statement	
Operable Unit: OU 1 and Site wide	*Protectiveness Determination:* Short-term Protective

Protectiveness Statement:
This FYR found the remedy to be currently protective of human health and the environment in the short-term. All residents who were potentially at risk have been connected to the municipal water supply and no exposure to groundwater contamination is occurring. Effective and enforceable ICs that prohibit certain uses and activities at the Site (e.g., groundwater use), have been implemented on the land parcels comprising the Site property. There are, however, some long-term concerns that need to be addressed at off-site areas in order for the remedy to be protective in the long-term. First, the proper recording of activity and use restrictions on two off-site land parcels to prohibit the potable use of groundwater needs to be verified. Second, as groundwater studies conducted since the last FYR indicate that the MNA remedy may not be effectively stabilizing the off-site, down-gradient plume, expanded groundwater monitoring and evaluation are needed to determine the appropriate follow-up measures to stabilize the plume and/or intercept it. And third, long-term stewardship procedures need to be developed and incorporated into an ICIAP or other equivalent document.

VI. NEXT REVIEW

The next FYR report for the U.S. Aviex Superfund Site is required five years from the completion date of this review.

APPENDIX A – EXISTING SITE INFORMATION

Appendix A

Tables

A. SITE CHRONOLOGY

Table 10: Site Chronology

Event	Date
U.S. Aviex plant manufactures non-lubricating automotive fluids	early 1960s to 1978
Underground pipeline containing diethyl ether (DEE) ruptures during excavation at the plant. Within a year, DEE is found in residential wells.	July 1972
MDNR and MDPH sample on-site and residential wells.	early 1970s to 1986
DEE is detected in nearby residential wells on Lilac Street. Low levels are identified on Blanchard Street and Almaugus Drive. U.S. Aviex provides bottled water to 44 affected homes wells through an agreement with MDPH.	1973 onward
A fire breaks out in the plant, rupturing chemical storage tanks. The large quantity of water used to extinguish the fire washes volatile organic chemicals (VOCs) into the soil and groundwater.	November 28, 1978
Underground production tanks are removed; septic tanks receiving sanitary wastes are pumped out, but not removed.	November 1978 and 1980
Chlorinated hydrocarbons are detected in groundwater approximately 400 feet west/southwest. Fourteen monitoring wells are installed, and five older wells are removed.	1980
Michigan initiates legal action against U.S. Aviex, resulting in a groundwater investigation.	Early 1982
U.S. Aviex is proposed for addition to the National Priorities List (NPL).	December 30, 1982
U.S. Aviex is added to the final NPL	September 8, 1983
On-site groundwater pump-and-treat system is installed and begins operating as a result of the groundwater investigation.	November 1983
Michigan allows EPA to take the lead role under the Superfund program.	Late 1984
Administrative Order on Consent (AOC) is signed between EPA and U.S Aviex to conduct an RI/FS for off-site groundwater contamination and source control.	September 30, 1985
U.S. Aviex files for Chapter 11 bankruptcy. EPA continues the RI/FS using funds set aside by U.S. Aviex.	January to October 1986
Construction begins on the public water supply distribution system for about 220 affected residences, funded by the Michigan Act 307 program.	August 1986
Final RI Report completed. EPA issues the Proposed Plan containing the recommended remedial alternative of the U.S. Aviex Site to the public	June 6, 1988
Public comment period	June 6 to July 18, 1988

Event	Date
EPA issues the Record of Decision (ROD)	September 7, 1988
Remedial Design (RD) completed	September 9, 1991
Remedial Action (RA) begins	June 1992
Groundwater pump-and-treat system becomes operational and functional. EPA contractor, PRC, begins operating the system.	June 14, 1993
EPA issues Explanation of Significant Differences (ESD) to modify the 1988 ROD by removing the soil flushing component.	September 23, 1993
Preliminary Close Out Report (PCOR) signed marking the completion of the remedial action (RA) construction.	September 21, 1993
Michigan Governor issues Executive Order 1995-18, separating environmental and natural resource functions into two separate departments; the remediation program is moved to MDEQ.	June 1995
Tetra Tech EM Inc. completes a Phase I groundwater study to assess the extent of contaminated groundwater in the surficial aquifer downgradient of the groundwater collection system. The investigation results in an "Additional Groundwater Assessment Summary Report" (February 27, 1998).	October 15 to November 13, 1997
U.S. Aviex Site enters the long-term remedial action (LTRA) phase of remediation and MDEQ assumes lead role for Site activities.	1998
First Five-year Review report is signed.	December 3, 1999
A Phase II groundwater assessment is conducted to define the extent of contamination downgradient of the pump-and-treat system at the Site, including a study to analyze future remedial alternatives to address downgradient groundwater contamination (report dated August 2001).	June 2000 to September 2000
MDEQ completes the investigation of the contaminated groundwater	2002
BIOX™ applications and ozone sparge pilot testing	October 2003 to March 2004
EPA issues ROD Amendment changing the remedy from groundwater pump-and-treat to ozone air sparging and MNA.	September 29, 2004
Ozone sparge system operates to reduce contaminant levels at the property	March 2004 to October 2007
Second Five-Year Review report completed.	December 3, 2004
Excavation of onsite principal source materials by MDEQ as an emergency response action	Fall 2007 – Spring 2008
EPA signs Third Five-Year Review report.	November 24, 2009

Event	Date
Groundwater Monitoring Plan changed.	October 2012
EPA issues SWRAU Determination.	January 29, 2013
MDEQ conducts soil gas sampling to assess vapor intrusion risk at the Site.	October 27-29, 2014
EPA conducts fourth Five-Year Review Site visit.	November 13, 2014

B. BACKGROUND

Physical Characteristics

The six-acre U.S. Aviex Site is located in Niles and Howard Township, Cass County, about two miles northeast of Niles, Michigan. The now-defunct facility produced non-lubricating automotive fluids between the early 1960s and 1978. An empty warehouse remains on site. The St. Joseph River is about 3.5 miles west of the Site and the nearest surface water body, the 199-acre Barron Lake, is about 0.75 miles northeast (see Figure 1). Surface and groundwater flow is toward Brandywine Creek to the south and eventually to the St. Joseph River, which empties into Lake Michigan. The primary land use in the area is rural and residential with a small subdivision immediately adjacent to the Site toward the south and west. Minor agricultural and horticultural activities occur in the general vicinity of the Site. The residential area is comprised of numerous single-family homes with some homes located within 100 feet north and east of the property perimeter. All the residences had their own water supply wells before the groundwater contamination was detected. There is no storm or sanitary sewers nearby, nor are there natural watercourses or drains within 2,000 feet of the Site.

Hydrology

The Site and the affected aquifer occupy part of an extensive northeast-southwest trending belt of ice-contact glacial sand and gravel deposits containing thin lenses and discontinuous interlayers of clay. The two major types of depositional groups in the area are glacial outwash and ice-contact outwash. The glacial outwash is drift or sediments deposited by melt water streams out beyond active glacier(s). Ice-contact outwash is outwash deposited in contact with a melting glacier. Both types of deposits are typically fine sand through course gravel with occasional large cobbles and are very poorly sorted. Beneath the former plant site, assorted clays and lenses compose varying but lesser amounts of the subsoils. A sandy clay layer underlies the sediments of the upper aquifer, which is between seven and 22 feet thick. The sediments beneath the sandy clay are predominately fine to medium sands. The sandy clay layer depth increases to the southwest of the Site. These clayey soils have a fairly high water capacity and moderately slow permeability.

The water table aquifer is encountered at 15 to 45 feet deep throughout the area investigated to the west of the Site. The aquifer has a saturated thickness of between 70 and 90 feet near the Site, increasing to 170 feet deep near the airport property. The groundwater flow velocity is

approximately one-half foot per day. The direction of groundwater flow is west-southwest changing to north/northwest apparently by the influence of the Niles municipal wells. The deep aquifer beneath the sandy clay layer is artesian and has a flow pattern similar to the upper aquifer in the area of the former U.S. Aviex Site.

Groundwater at this location in the surficial aquifer used as a potable supply moves in a southwesterly direction at the rate of 100 to 300 feet per year. The aquifer formation consists of sands and gravels with clay lenses. The chemical contaminants in the groundwater move primarily in the direction of groundwater flow. The water supply system for the city of Niles taps a deeper portion of the aquifer that is beneath two clay layers and is considered to be slightly confined. However, because there is migration of the contaminant plume through the topmost clay layer, these confining clay layers may not be sufficiently thick or continuous to prevent downward migration. Therefore, the water supply wells for the city of Niles could potentially become contaminated from long-term westward and downward migration of the contaminant plume.

Land and Resource Use

The Site is surrounded by private residences (see Figure 3). There is some commercial development along M-60 and Yankee Streets. Agricultural areas are located about one-half mile southeast of the Site. An airport, a sewage treatment lagoon, and other light industries are located about one mile west of the Site. Howard Township is a zoned community, consistent with the above description of land use. Limited agricultural activities occur in the area immediately surrounding the Site. Important agricultural products include soybeans, corn, and sheep. However, much of the farmland in the immediate vicinity of the U.S. Aviex Site is unused.

The city of Niles occupies about 5.5 square miles and while principally located in Berrien County, also extends into Cass County. According to 2010 census data, the population of Niles is 11,600. Over the past five decades, the city's population has been declining. The 2010 population of Niles and the surrounding townships of Niles, Howard, Bertrand and Milton is 37,200 (U.S. Bureau of the Census 2010).

The city of Niles owns and operates a small general aviation airport for private and charter use. The Jerry Tyler Memorial Airport has two runways and serves Niles and Berrien County (see Figure 1). The airport and surrounding properties are zoned for industrial uses. The adjoining uses in Cass County and Howard Township are rural and undeveloped. The Federal Aviation Administration reviews and approves applications for development within a certain proximity to the airport.

The Niles Municipal Water supply system consists of seven wells, an iron filtration plant, a booster pumping station and five elevated storage tanks. The city water supply capacity was 7.6 MGD but currently, only pumps an average of two MGD, with the peak usage going up to almost four MGD in the summer. Certain wells have back-up generation to pump water during power outages. The city has five elevated water tanks and certain wells have back up generation, or motors, to be able to pump water during power outages.

A significant portion of the city of Niles water distribution system was installed more than 50 years ago. After completion of a water reliability study in 2003, the city improved its water system infrastructure by adding an iron filtration plant, establishing an intermediate water pressure district on the east side of town, and adding water storage in the Bertrand Township Industrial Park. The municipal wells are screened from approximately 120 to 160 feet deep. About 225 homes in Niles and Howard Townships near the Site are now connected to the Niles municipal water supply.

In 2003, the State of Michigan completed a Source Water Assessment. Groundwater susceptibility is determined by the number and type of contamination sources within the WHPA, with additional consideration to well construction and the chemical monitoring history of individual production wells. The U.S. Aviex Site is included in the contaminant source inventory. Information from the WHPA delineation for the seven production wells indicated the aquifer from which the city obtains groundwater is characterized as "leaky-confined." The city's seven production wells possess a "moderately high" susceptibility based on geologic sensitivity analysis and the potential contamination sources within the WHPA. The city implemented a Wellhead Protection Program in response to this information. No MCL exceedances have ever occurred in the city water.

History of Contamination

The U.S. Aviex plant manufactured non-lubricating automotive fluids between the early 1960s and 1978, as well as repackaged bulk products. Bulk chemicals were stored either in aboveground tanks, belowground tanks, steel drums, or fiber-pak drums. All tanks were connected to the batch and filling rooms by underground or overhead pipelines. Materials stored above ground included No. 1 heating oil, kerosene, methanol, propane, isobutene and refrigerants (freons). An above-ground pressurized starting-fluid batch tank containing ether and propane was located in the underground tank area situated immediately east of the truck dock. Other above-ground tanks included two batch tanks contained oleic acid and an animal-fat acid. Below-ground storage included three ether tanks.

During the 1960s and/or 1970s, unquantified amounts of chlorinated hydrocarbons were released into the vadose zone of the soils in the area south of the process rooms. The soils were found to contain significant levels of benzene, 1,2-dichloroethane (1,2-DCA), 1,1-dichloroethene (1,1-DCE), diethyl ether (DEE), dichlorofloromethane (DCFM) 1,1,1-trichloroethane (1,1,1-TCA), trichloroethene (TCE), trichlorofluoromethane (TCFM), trans-1,2-dichloroethane (trans-1,2-DCE) and perchloroethene (PCE). Nearby residential wells were later found to be contaminated with one or more of these chemicals. These ten chemicals constitute the COCs or indicator chemicals at the Site.

In July 1972, an underground pipeline containing DEE broke during excavation on the plant site. The break occurred in the southeast area of the plant. Within three to four months, DEE was detected in the part-per-million (ppm) range in nearby residential wells on Lilac Street. By August 1973, ether at the level of 11 ppm had been identified on Lilac Street. Over the next several years, low levels of DEE contamination were identified in downgradient residential wells located southwest of the plant as far as one-half mile away on Blanchard Street and Almaugus Drive.

The U.S. Aviex Company installed four 20-foot deep and two 40-foot deep monitoring wells on the Site beginning in 1972. These wells are located near the south property line and in the former process building area, and include TW-1 and TW-2 (20-ft and 40-ft wells at both locations) and TW-4 (20-ft). Well TW-3 was a 20-foot deep well located at the west warehouse (see Figure 3).

On November 28, 1978, a fire broke out near the process buildings located at the southeast end of the plant. Many thousands of gallons of water were needed to extinguish the fire over a two-day period. Barrels and indoor tanks of stored chemicals were ruptured during the fire and their contents were either consumed by the fire or washed from the Site into unpaved areas and the groundwater. Four large trucks loaded with aerosol cans of dry gas were destroyed in the fire.

Following the 1978 fire and the discovery of chlorinated hydrocarbon contamination of groundwater as far west as 1050 Bame Street, the U.S. Aviex Company installed 14 additional monitoring wells in 1980 which included four 20-foot, six 40-foot, three 60-foot, and two 150-foot deep wells. The deepest wells were placed below a clay layer believed to separate the upper contaminated aquifer from unaffected groundwater below. Wells F-40, G-20, H-20, 1-20, TW-3 were removed during the excavation of the buried tanks. Throughout the 1970s to mid-1980s, the Michigan Department of Natural Resources (MDNR), and the Michigan Department of Public Health (MDPH), including the Cass County Environmental Health Department, sampled on-site and neighborhood wells and kept files of the analytical results.

Initial Response

Previous responses by U.S. Aviex include pumping the contaminated groundwater using small-diameter onsite monitoring wells during the 1970s and early 1980s. The total quantity pumped was estimated to be 100,000 gallons. The produced water passed through activated carbon filters before being returned to the ground by infiltration. The on-site groundwater pump-and-treat system resulted in partial cleanup of contaminants from beneath the Site. Except for TCA, the actual amount of chemicals removed from the groundwater is not known. The amount of TCA removed approached the equivalent of three 55-gallon drums of the pure material over three years of pumping.

Commencing in 1972, U.S. Aviex provided bottled water to homes with contaminated wells under an agreement with MDPH. About 32 homes were provided with water and 12 homes with wells in a lower, uncontaminated aquifer, also by agreement with MDPH. Early in 1982, Michigan initiated legal action against U.S. Aviex, resulting in a groundwater investigation and the installation of a more effective onsite groundwater pump-and-treat program. The on-site program began operating in November 1983, and provided two extraction wells pumping up to 200 gallons-per-minute (gpm) from the contaminated upper aquifer, treatment by air stripping, and surface discharge of the treated water into a drain, which is part of the St. Joseph River system. Containment of contaminated groundwater, however, was not complete in the western and northern boundaries of the property allowing continuous contaminant migration downgradient from the Site.

Late in 1984, Michigan decided to allow EPA to lead the cleanup for this Site under its Superfund Program. As a result, EPA and U.S. Aviex reached a negotiated agreement providing for a remedial investigation and feasibility study (RI/FS) to investigate off-site groundwater

contamination and on-site source control late in 1985. The RI report, prepared by EDI Engineering and Science (EDI) on behalf of U.S. Aviex in 1985, was finalized by EPA's contractor, Jacobs Engineering, in 1988.

Early in 1985, Michigan offered to provide a public water supply and distribution system to homeowners in the area under Michigan Act 307. This act provides funding for emergency remedial measures related to state-ranked hazardous sites. In August 1986, Howard Township let contracts to install a public water distribution system in the affected neighborhoods. The system was designed to distribute water from the Niles municipal water supply system to about 220 homes in the area.

In 1986, U.S. Aviex filed Chapter 11 bankruptcy with the Bankruptcy Court for the Eastern District of Michigan. Funds had been previously set aside by U.S. Aviex to pay for the RI/FS so that the bankruptcy action did not stop the ongoing RI/FS at the Site.

Basis for Taking Action

Significant levels of TCE, PCE and TCA were present in the vadose zone beneath the paved entrance driveway opposite the process buildings. Light contamination was present in the shallow soils of the truck dock. The contamination was being contained by the extraction well systems. Significantly contaminated groundwater was present beneath the entrance driveway due to the leaching of chemicals in the vadose zone. In addition, DEE in a thin, semi-isolated groundwater zone in the north area of the Site near Well 82-3 was not being efficiently drawn into the extraction wells. Both of these contaminated zones were contained by the extraction well system, but the contamination would migrate offsite if the pumping system was discontinued.

Concentrations of the DCA isomers and xylene above 1 ppm and other chemicals at lower levels were detected in the groundwater near the west boundary of the Site. These chemicals were partially drawn into the west extraction well, but the system was not effectively cleaning up the groundwater in this area due to the contamination in the downgradient direction beyond the capture zone.

In August 1981, U.S. Aviex consultants submitted a report indicating that chemicals discharged to the ground during the fire had appeared in downstream wells off-site and confirmed that the contamination was moving vertically and horizontally in the aquifer. The consultants measured over 200 ppm TCA and acetone in some onsite wells, DEE concentrations as high as 52 ppm, isopropyl alcohol at 40 ppm, and toluene and xylene at 8.8 ppm and 9.6 ppm, respectively. Lower concentrations of these chemicals were measured in off-site wells. MDNR's sampling and analysis confirmed these findings. Human exposure to hazardous materials such as TCA was occurring through ingestion of drinking water from groundwater supplies. Several of the affected wells were replaced. The remaining affected water supply users were provided bottled water. Currently no one is exposed to contaminated drinking water from the Site.

The closest municipal wells to the U.S. Aviex Site are about two miles west of the Site; these wells are located at Terminal Road and Lake Street (Airport Wells #1 and #2). These wells produce more than one-million GPD from the unconsolidated sediments. In the immediate Site vicinity, groundwater flows in a southwesterly direction. At approximately one-half mile

downgradient, the direction becomes westerly and eventually northwesterly at the last monitoring well location, putting the Niles municipal wells directly downgradient from the migrating contaminant plume.

C. REMEDIAL ACTIONS

The RI results indicated that chemicals originating in the ground at the U.S. Aviex Site flowed off-site in a southwesterly direction along with the groundwater in the upper aquifer. This RI study defined the off-site plume, which was bounded on the north by a line from the Site west-northwest to near the intersection of Janellen and Carberry Roads, on the southeast by an irregular line extending from the Site in a south-southwesterly direction, and on the west by Carberry Road. The plume contaminants included chlorinated hydrocarbons, DEE, and other VOCs. Significant quantities of chlorinated hydrocarbons were also present on site. These were found in the soils beneath the entrance driveway near the southeast process buildings. There were also traces of some compounds in the truck dock near the west warehouse.

Chemicals present in the neighborhood upper aquifer continued to flow southwest and west down the hydraulic gradient into farther reaches of the neighborhood. The estimated speed of groundwater movement down the centerline of the plume in the study area was about one-half foot per day. Chlorinated hydrocarbons and DEE in the soils and groundwater beneath the Site would move from the Site in the groundwater in significant concentrations if the extraction wells were shut down.

The study showed that all contaminants were confined to on-site subsurface soils and to on-site and off-site groundwater, and that contaminated groundwater would not enter any surface water body during the 30-year time span considered in the RI report. Hence, at the time, there was no immediate or short-term risk of environmental exposure to chemicals in surface water coming from the U.S. Aviex Site. Long-term exposure (up to 70 years) to surface water was not considered by the RI/FS and was not an exposure pathway of concern in the Endangerment Assessment (EA).

The water quality of the municipal wells located approximately three miles west of the Site was unlikely to be affected by the groundwater contamination in the neighborhood at the time. However, assumptions about the potential pumping influence of these wells and the modeling indicated that the plume or a part of it could be eventually drawn into the city wells. The Airport and Parker Street Wells are located approximately one mile northwest and west, respectively, of the intersection of Carberry Road and Yankee Street (Business Route 60). The Airport Well was pumped at a rate of 650 gpm and the Parker Well at 750 gpm, producing a combined average of 1.26 MGD. The actual pumping effect of the city wells on the plume had not been tested.

All potential human health risk estimates were based on EPA proposed and final SDWA MCLs, EPA drinking water quality criteria values, or MDNR Human Lifecycle Safe Concentration (HLSC) values. The EA considered both carcinogens and toxic noncarcinogenic compounds. Though all routes were evaluated, the only significant exposure route identified was the ingestion of contaminated groundwater. Potential exposure from ingestion of drinking water containing significant levels of chlorinated hydrocarbons was based on total carcinogenic risk and/or risk from toxicological threshold values. The carcinogens considered in the risk assessment included

benzene, 1,1-DCE, 1,2-DCA, PCE, and TCE. The toxic, noncarcinogenic compounds included 1,1,1-TCA, 1,1-DCA, DEE, trans-l,2-DCE, TCFM and DCFM.

Modeled exposure point concentrations in groundwater from the RI were not used in the EA because the RI considered only a 30-year period instead of the necessary 70-year period required for chronic risk calculations. Further, the modeled area did not include the water supply wells for the city of Niles, yet there was sufficient evidence to indicate that those wells may eventually be endangered. Contaminant concentrations within the plume were expected to decrease with time as the plume migrated downgradient and spread laterally. Exposure point concentrations were estimated at several locations within the plume in order to describe this temporal and spatial variation. Two simple models were used to estimate contaminant concentrations: 1) continuous release model that assumes extraction well pumps are off ("pump off"); and, 2) instantaneous release model assumes the pumps are on ("pump on"). For both models, contaminant concentrations were calculated for 70 years at Almaugus Street (one-third mile downgradient of the Site), at Carberry Road (one mile downgradient of the Site), and at the Niles municipal wells (two miles downgradient of the Site).

The continuous release model predicted concentrations ten-fold greater than those calculated from the instantaneous release model. In the worst-case scenario (continuous release model) 1,2-DCA, 1,1-DCE, TCE and 1,1,1-TCA were at unacceptable levels up to one-third mile downgradient of the Site. At one mile from the Site, 1,2-DCA, TCE and 1,1,1-TCA were at unacceptable levels. At the municipal wells two miles from the Site, no COCs were at unacceptable levels by the end of the projected 70-year period.

The risk was potential and would only occur if the extraction wells that withdraw contaminated water from the Site were not pumped at then current rates and municipal water was not supplied to all consumers. The noncarcinogenic chronic Hazard Index (HI) of 1.0 is the toxic threshold value by which EPA determines whether any adverse noncarcinogenic health effects would be expected to occur due to exposure. The HI exceeded 1.0 only for the "pump off" scenario at Almaugus Street. Two indicator chemicals, 1,1-DCE and 1,1,1-TCA, contributed most heavily to this risk. The chronic HI was not projected to exceed 1.0 over a 70-year period at the more distant locations. The subchronic (less than 70 years) HI did not exceed 1.0 at any location. These conclusions would be the same for resident children, even though they have a daily intake about four times that of adults.

For carcinogens, there are no acceptable daily intakes. Incremental cancer risk exceeding the $1x10^{-6}$ (or one-in-one-million) excess lifetime cancer risk indicates potential endangerment. EPA considers the $1x10^{-4}$ (one-in-ten-thousand) to $1x10^{-6}$ cancer risk range to be the upper limit of acceptable risk. Carcinogenic risks from groundwater ingestion exceeded $1x10^{-6}$ at both Almaugus Street and Carberry Road, assuming either continuous or instantaneous release. In the worst-case (continuous release) scenario, 1,2-DCA, 1,1-DCE, PCE, TCE and benzene all exceeded $1x10^{-6}$ at Almaugus Street. At Carberry Road, all contaminants except for benzene and 1,1-DCE exceeded this level. There was no appreciable cancer risk ($1x10^{-8}$) at the Niles municipal wells.

As mentioned, Howard Township installed a water supply distribution system to a large portion of the study area that was funded by MDNR Act 307. Howard Township now prevents the

installation of any drinking water wells in areas served by the distribution system. The system eliminated the human health concerns in the neighborhood as long as all residents in the potentially affected area hooked up to the distribution system and all new homes constructed in the potentially affected area tied into this water supply system. The data suggested that the service area of the new water supply system in the neighborhood (250 or more residences) was many times larger than the total number of houses actually identified as having affected wells (17 houses) or the estimated 40 residences within the contoured risk area.

Based upon the results of the modeling, the potential contaminant plumes that could result from the No Action alternatives ("pump on" or "pump off") were considered unacceptable and were sufficient reasons, along with the existing Site conditions, to require remedial action measures.

It should be noted that, as with the groundwater modeling performed during the RI wherein modeled groundwater exposure point concentrations were not considered accurate for use in the EA, the EA modeling also eventually proved to be inaccurate and biased toward under-predicting the human health risk. More recent investigations have identified contaminant concentrations further downgradient of what the model predicted would occur. However, the in-place sentinel monitoring network has effectively detected potential threats to the Niles public water supply. If contaminant concentrations are detected in the sentinel wells, there is a ten-year time buffer to mitigate the contamination before the Niles municipal wells would become adversely affected. Further, the corrected risks were not significantly greater than the risk associated with the Site cleanup criteria.

Remedy Selection

The U.S. Aviex Site posed a public health hazard from exposure to contaminated groundwater. The risk resulted from the potential for persons in the affected area to consume contaminated groundwater and from the long-term potential impact on the city of Niles municipal water supply wells. The overall remedial action objectives (RAOs) were:

1. To provide onsite control of the contaminant source by minimizing leachate production of contaminated groundwater beneath the Site, and to prevent its migration offsite.

2. To provide offsite management of plume migration. Pumping and treating groundwater contaminated above the $1x10^{-6}$ and/or noncarcinogenic threshold (i.e., the HI) of 1.0 to meet Federal or State drinking water quality standards and criteria will reduce the potential for human exposure to contaminants and reduce the impact on groundwater resources by minimizing offsite migration of contaminants.

Control of the contaminant sources was to be achieved by flushing the contaminants out of the vadose zone soil. The sub chronic and chronic Hazard Indices from inhalation of volatiles emanating from soil were all much less than 1.0. The potential cancer risk due to inhalation of soil volatiles was estimated to be 6.6×10^{-7}. The cancer risk from direct contact with soil was 1.1×10^{-7}. These exposure routes represented a low potential for endangerment.

Soil cleanup levels were based on leachate testing to meet the appropriate groundwater cleanup goals. The effectiveness of the flushing system was to be evaluated after five years of operation.

This evaluation would be based on soil sample results for the ten indicator COCs. If there was no reduction in contaminants, an alternate remedy was to be identified in a new FS and justified in a new ROD.

The groundwater cleanup strategy was to install and operate extraction wells in the plume. The wells were to collect and treat onsite and offsite contaminated groundwater within the Site-related $1x10^{-6}$ risk plume[5] and in the primary plume, out to its projected limits. Used flushing fluids would be collected along with the onsite contaminated groundwater. The extracted groundwater was to comply with existing drinking water standards or EPA or MDNR water quality criteria values for human health.

Table 8 of Appendix B lists the clean-up goals of the 1988 ROD. The proposed groundwater cleanup alternative was to operate until the water quality within the plume was remediated to a level that was either at or below the individual compound cleanup goals. In the process of achieving groundwater cleanup goals, the extracted groundwater would be treated to comply with the minimum concentrations for the COCs prior to discharge. The discharge concentrations were based on either NPDES permit limits or publicly owned treatment works (POTW) industrial pretreatment standards.

The potential impacts to the Niles municipal wells were determined in EPA's EA based on a worst-case scenario, i.e., No Action and the continuous release of contaminants at the Site. Under this scenario, analysis indicated that COCs would be at acceptable levels at the municipal wells at the time of arrival of the plume after approximately 70 years. The proposed alternative was expected to treat the sources of potential contamination and to eliminate any potential for impact on the municipal wells.

Remedy Implementation

In September 1991, Michigan entered into a Superfund State Contract with EPA to fund its share of the RA construction. The EPA was the lead agency for design and construction of the remedy. The Preliminary Close-Out Report (PCOR) of September 21, 1993 documented that all construction activities had been completed. These activities included:

- Soil-flushing system to remediate the source soil;
- Multi-well extraction system to contain the plume and remove the contaminants;
- Air stripper to remove volatile and halogenated organic compounds in onsite and offsite contaminated groundwater above $1x10^{-6}$ risk, a HI above 1.0, or applicable or relevant and appropriate requirements (ARARs); and
- Discharge of treated groundwater to surface waters under a National Pollutant Discharge Elimination System (NPDES) permit.

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[5] This $1x10^{-6}$ total risk plume is that volume of water that contains contaminants at concentrations that pose an increased lifetime risk of one cancer case in a population of one million people.

Based upon the sampling results of the pre-design studies conducted after the 1988 ROD, EPA determined that the risk from the remaining source soils did not present a significant current or future threat to the groundwater beneath the facility to warrant installing and operating the planned soil flushing system. EPA issued an Explanation of Significant Differences (ESD) on September 23, 1993 to remove the soil-flushing component from the 1988 ROD.

MDEQ assumed the operation of the treatment system duties from the EPA in October 1994, and in October 1995, the Site became fund-financed state-lead for O&M costs over ten years. In October 1997, EPA defined the horizontal and vertical extent of contaminated groundwater bypassing capture by the pump and treat system. The investigation discovered 1,2-DCA and DEE above cleanup levels beyond the capture zone of the extraction system. In 1999, MDEQ received a grant from EPA for state-lead work to determine how to best capture and clean up the escaping plume.

In 2000, MDEQ installed an additional extraction well (EW-6) to prevent further downgradient migration of contaminated groundwater until the extent of contaminated groundwater could be fully defined. A 2002 MDEQ investigation concluded that contaminated groundwater had migrated past the capture zone of the expanded pump-and-treat system; however, only 1,2 DCA was found downgradient of the Site at concentrations that exceeded its MCL of 5 µg/L.

Quarterly groundwater monitoring was performed during this period on select monitoring wells. Although quarterly monitoring results demonstrated a significant decrease in dissolved-phase VOC levels near EW-5 since 1993, several VOCs persisted at this location above the clean-up criteria established in the ROD. Quarterly monitoring continued to confirm groundwater contamination downgradient of the Site at concentrations exceeding ROD criteria.

MDEQ conducted additional groundwater investigations in 2002 and 2003 to better define the extent of the downgradient plume, the effectiveness of the pump-and-treat system, and to evaluate the concentrations of impacted groundwater still migrating from the Site. These investigations identified higher concentrations of contaminants, including the presence of LNAPL, remaining in the source areas on the plant property than had previously been identified.

Based upon the results from the 2002 and 2003 investigations, the MDEQ and the EPA installed a series of additional monitoring wells (RL-l, RL-2, RL-3, and RL-4) downgradient of the contaminated areas to further monitor the concentrations and to insure the detection of any remaining contaminated groundwater, should it migrate further into the two separate well-head protection areas (see Figure 3).

In about 2003, MDEQ determined that the remaining source areas on the Site property were not being adequately addressed by the pump and treat system due to its age and inefficiency and the amount of VOCs remaining at the Site. MDEQ, with the EPA's concurrence, performed expanded pilot tests in 2003 and 2004 at the Site to address the areas. The pilot studies consisted of ozone sparging and enhanced bioattenuation of the groundwater by injecting a chemical product (BIOX^{TM}) into the perched water table just north of the warehouse to facilitate natural attenuation of the contaminants. The pump-and-treat system was shut down in late 2003. Figure 13 illustrates the Site areas where these activities occurred.

EPA issued a ROD Amendment on September 29, 2004 that called for the following major components:

- Use MNA to remediate the plume and in-situ ozone/air sparge to treat the perched water table source area north of the warehouse;
- Shut down the existing groundwater P&T system;
- Modify the current groundwater monitoring plan;
- Update the groundwater clean-up criteria to reflect current MCLs or the current Michigan Part 201 Residential Health-Based Drinking Water Criteria[6];
- Provide contingency plans that may include the operation of the existing pump and treat system with a new air stripper, and/or the installation of a downgradient pump and treat system.

In April 2005, MDEQ investigated the property in the area north of the warehouse (also referred to as the Storage Building) to further delineate the source of LNAPL in that area. The study recommended further assessment and remediation in the subject area.

In July 2005, MDEQ personnel flush-mounted and redeveloped all monitoring wells on the Site property and surveyed the monitoring wells and soil boring locations from the April 2005 investigation. MDEQ installed additional monitoring wells and replaced certain previously abandoned wells and piezometers throughout the Site in September 2005.

In November 2005, MDEQ conducted an additional soil and groundwater investigation at the Site near monitoring well WMW-7a to further delineate source area contamination for the proposed system expansion south and east of monitoring well WMW-7a. The investigation indicated dissolved phase contaminant concentrations east of the ozone/air sparge treatment system consistent with a source area. The ozone/air sparge treatment system was expanded in June 2006 to include this area. The system enhancements included installation of five additional sparge wells and one performance monitoring/groundwater monitoring well, trenching for sparge transmission lines, and connection of the five expansion wells to the ozone/air sparge treatment system. The ozone/air sparge system operated continuously until its planned shutdown in March 2007.

As per the ROD Amendment (2004), WESTON designed and implemented the following major tasks to achieve the MDEQ's goal of obtaining an approved partial closure with monitoring for the Site:

---

[6] At that time of the ROD, MCLs for DEE, DCFM and TCFM had not been promulgated under the SDWA. In 1990, Michigan promulgated Administrative Rules pursuant to Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Part 201), regulating and establishing criteria for the cleanup of contaminated sites.

- Excavation, dewatering, and disposal of contaminated soil in the source area north of the warehouse/Storage Building;
- Extension of the existing municipal water main into the Hickory Hills subdivision;
- Installation of residential service connections to the existing water main and the newly installed water main extension;
- Abandonment of select residential water supply wells;
- Demolition and abandonment of the existing groundwater pump and treat system;
- Restoration of disturbed properties.

The items summarized above were completed in accordance with the Project Manual and also documented in a draft *Construction Summary Report* (WESTON, 2009).

Operation and Maintenance (O&M)

Since 2004, the MDEQ has been the lead agency for conducting O&M activities at the site, which consist of monitoring groundwater for natural attenuation of contaminants. These details are discussed in the O&M Section of the main report.

APPENDIX B – additional maps, data, figures, or tables for reference

Figures

Figure 1 – Site Location Overview Map
Figure 2 – Site Location Map
Figure 3 – Site Feature and IC Map
Figure 4 – Site Survey Map of Affected Area for ICs
Figure 5 – Groundwater Flow Regime for Site Property
Figure 6 – Groundwater Flow Regime for Study Area
Figure 7 – Site Analytical Results for October 2012
Figure 8 – Site Analytical Results for May 2012
Figure 9 – Site Analytical Results for October 2013
Figure 10 – Study Area Analytical Results for May 2013
Figure 11 – Study Area Analytical Results for October 2013
Figure 12 – Cross-Section of Plume Depths in Select Monitoring Wells
Figure 13 – Diagram of Site Removal Activity Locations

Tables

Table 6 – Monitoring Well Points and Sampling Frequencies
Table 7 – Static Water Level Measurements and Well Construction Summary
Table 8 – Groundwater Cleanup Criteria and Maximum Detected Levels
Table 9 – Monitored Natural Attenuation Screening Parameters

Attachments

Attachment 1 – Grant of Easement to MDEQ for Site Access
Attachment 2 – Declaration of Restrictive Covenant and Easement for Site Parcels
Attachment 3 – Quitclaim Deed for Transfer of Site Property
Attachment 4 – Howard Township Zoning Ordinance
Attachment 5 – City of Niles Well Head Protection Area Zoning Ordinance
Attachment 6 – Public Notice Announcing Five-Year Review
Attachment 7 – List of Documents Reviewed for Five-Year Review
Attachment 8 – FYR Site Inspection Checklist and Photograph Log

N

0 3,000 Feet

Figure 1

WESTON SOLUTIONS

600 East Lakeshore Drive
Suite 200
Houghton, MI
49931

SITE LOCATION MAP
U.S. AVIEX SITE
NILES, MI

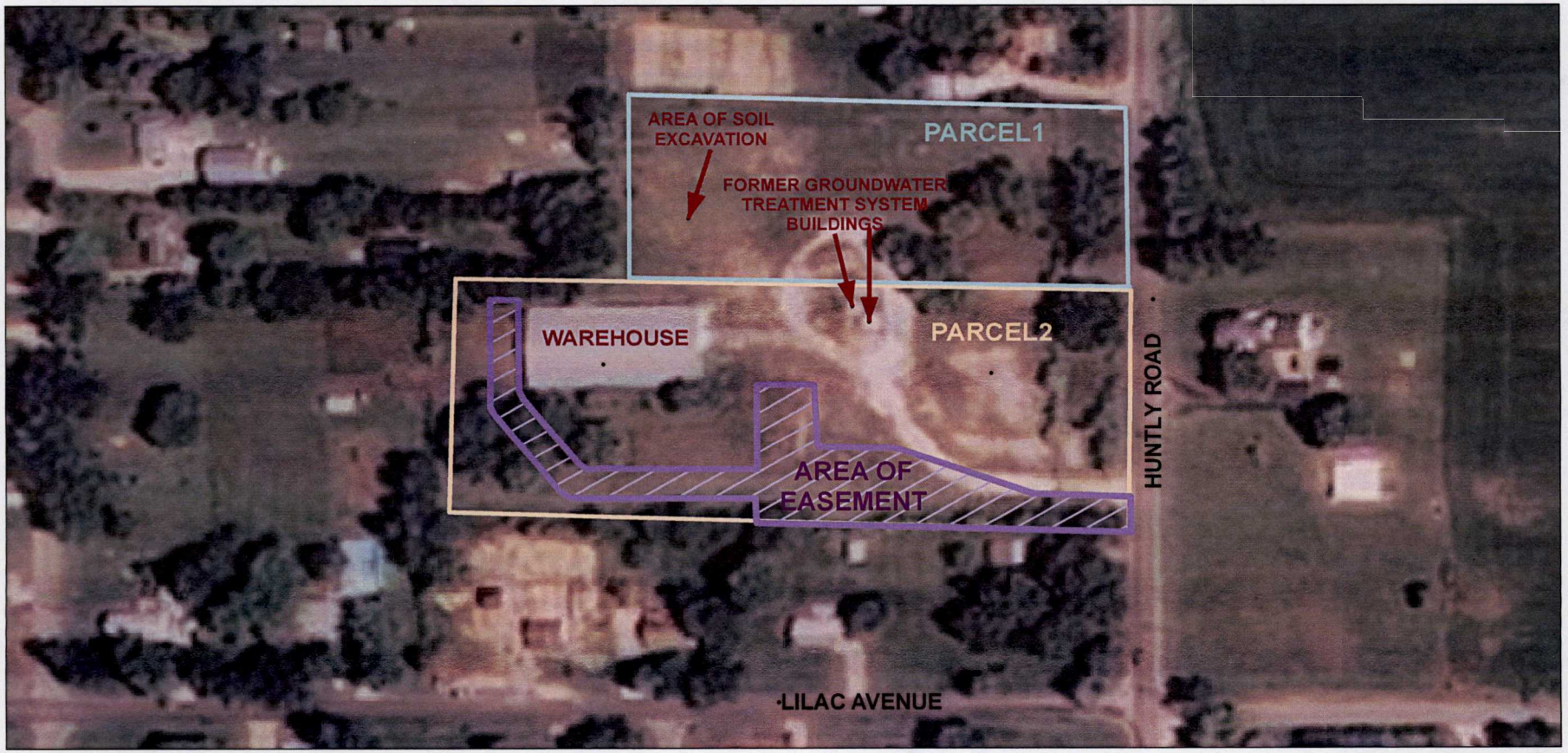
Path: D:\GIS_Projects\MDEQ\20176.008.001_Aviex\mxds\Figures_0813\Fig 01 - Site Location Map rev.mxd, 8/20/2013 9:17:03 AM, BROWNK

Institutional Control (IC) Review
Site Base Map

Superfund
U.S. Environmental Protection Agency

US AVIEX SITE
CASS COUNTY, NILES, MICHIGAN

MID980794556



Legend of Restricted Areas

- Area of Easement
- Parcel1
- Parcel2

0 110 220 330 440 Feet

N

GEOS
Groundwater Evaluation and Optimization System

Created by Cesar Capacete
U.S. EPA Region 5 on 12/14/12

FIGURE 2

Institutional Control (IC) Review
Site Base Map

Superfund
U.S. Environmental Protection Agency

US AVIEX SITE
CASS COUNTY, NILES, MICHIGAN

MID980794556

Legend of Restricted Area

Area of Activity and Use Restriction
under the Declarations of Restrictive Covenant
and Grant of Environmental Easement

0 110 220 330 440 Feet

N

FIGURE 2A

GEOS
Groundwater Evaluation and Optimization System

Created by Cesar Capacete
U.S. EPA Region 5 on 1/24/2013

Path: D:\GIS_Projects\MDEQ\20176.008.001_Aviex\mxds\2013_GWTM\Fig 02 - Site Map.mxd, 11/20/2014 10:30:06 AM, stolzs

LEGEND

- ABANDONED MONITORING WELL
- MONITORING WELL NOT INCLUDED IN THE SEMI-ANNUAL SITEWIDE SAMPLING PROGRAM
- MONITORING WELL INCLUDED IN THE SEMI-ANNUAL SITEWIDE SAMPLING PROGRAM
- FENCE
- STORAGE BUILDING

N

0 275 550 Feet

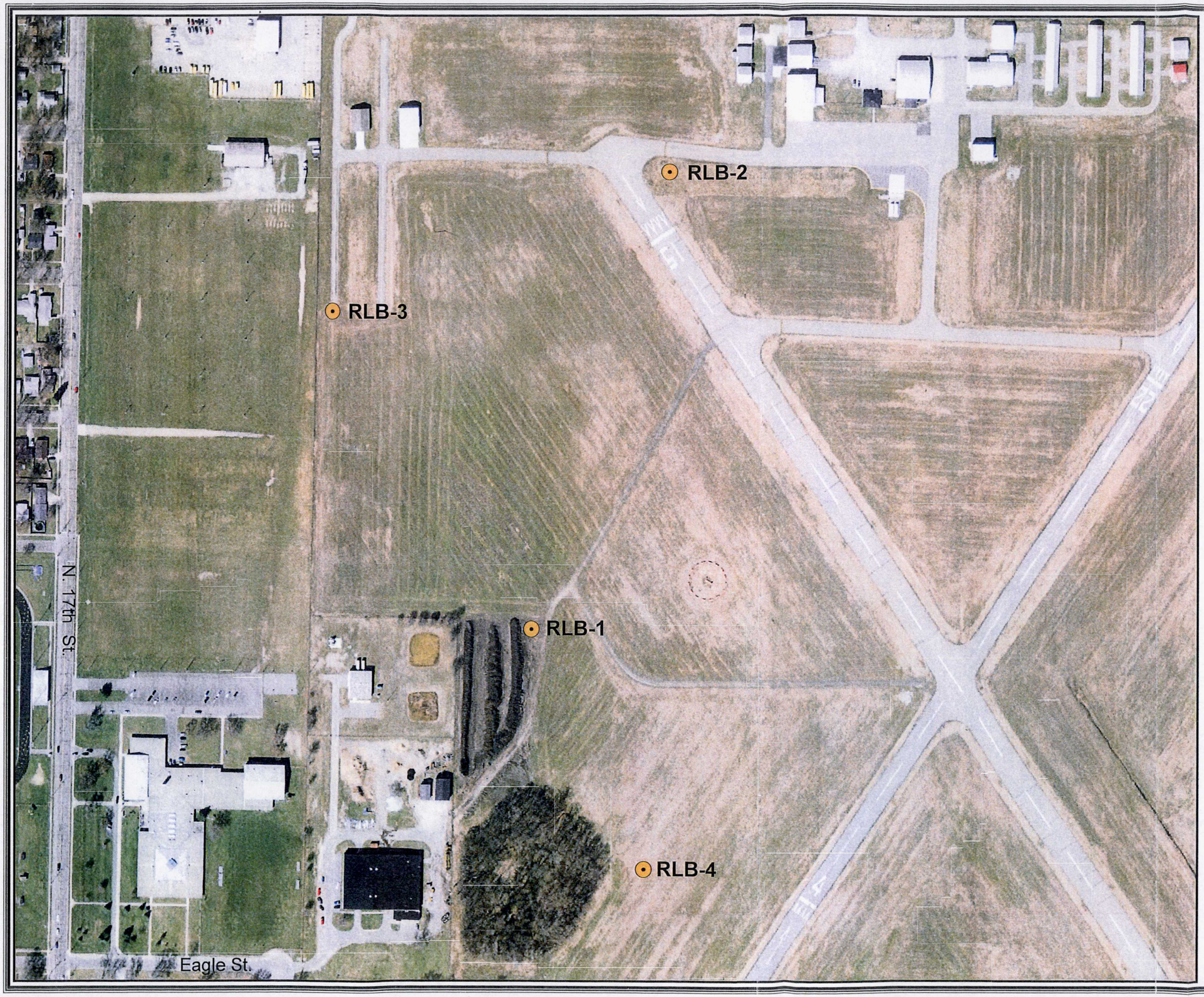
DEQ
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION
SUPERFUND SECTION

WESTON SOLUTIONS
Prepared by:
WESTON SOLUTIONS of MICHIGAN, INC.
600 East Lakeshore Drive, Suite 200
Houghton, Michigan

SITE MAP
U.S. AVIEX SITE
NILES, MI

Figure 3

SCALE:	DRAWN:	DATE:	CHECKED BY:
1:6,600 / 1:1,200	SDS/KRB	11/20/2014	DPL



N

W E

S

RLB Rose Lake Boring

DATUM - NAD83
PROJECTION: MICHIGAN GEOREF
AERIAL PHOTO SOURCE: Restricted MSU
AERIAL PHOTO DATE: 2010 Natural Color
AERIAL RESOLUTION:1 foot PIXEL

0 30 60 120 Meters

0 55 110 220 Feet

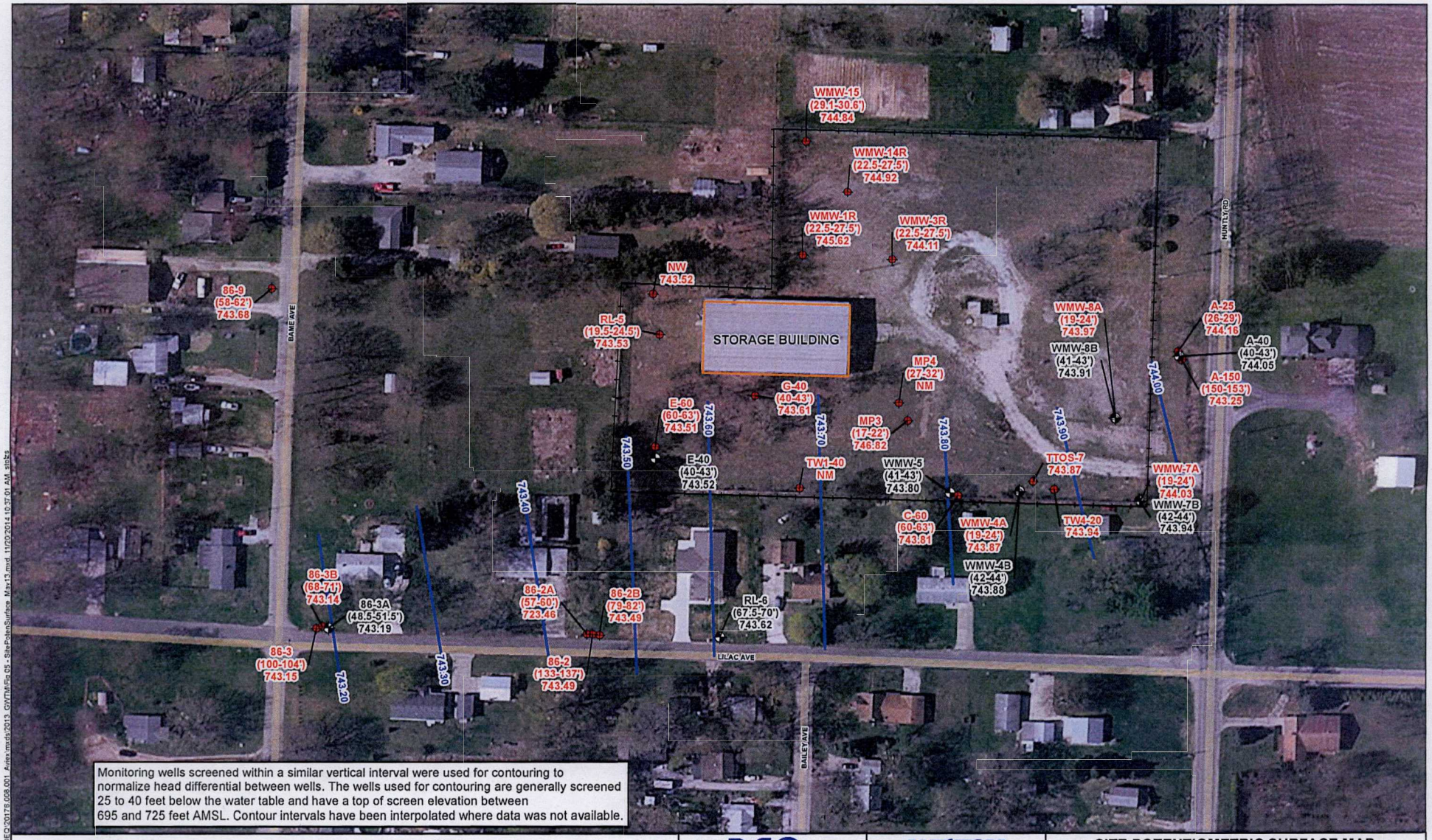
1 inch = 250 feet

U.S. Aviex

Berrien Co. -T5S-R17W Sec. 25

Soil Boring Locations

GEOLOGIST Brian G. Jeffs MS. CPG. Geological Services Unit		CREATION DATE October 2014
Remediation and Redevelopment Division	DEQ	Figure 4



Monitoring wells screened within a similar vertical interval were used for contouring to normalize head differential between wells. The wells used for contouring are generally screened 25 to 40 feet below the water table and have a top of screen elevation between 695 and 725 feet AMSL. Contour intervals have been interpolated where data was not available.

Monitoring Well Location - Used for Contouring
Monitoring Well Location - Not used for Contouring
Groundwater Elevation Contours (May 2013)
FENCE
STORAGE BUILDING

Notes:
- Contour Interval is 0.1 ft
- (41-45') = Well Screen Interval (feet below ground surface)
- NM= Not Measured
- Source of Imagery: ArcGIS/Bing Map Service March/April 2012

N

0 50 100 Feet

Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION
SUPERFUND SECTION

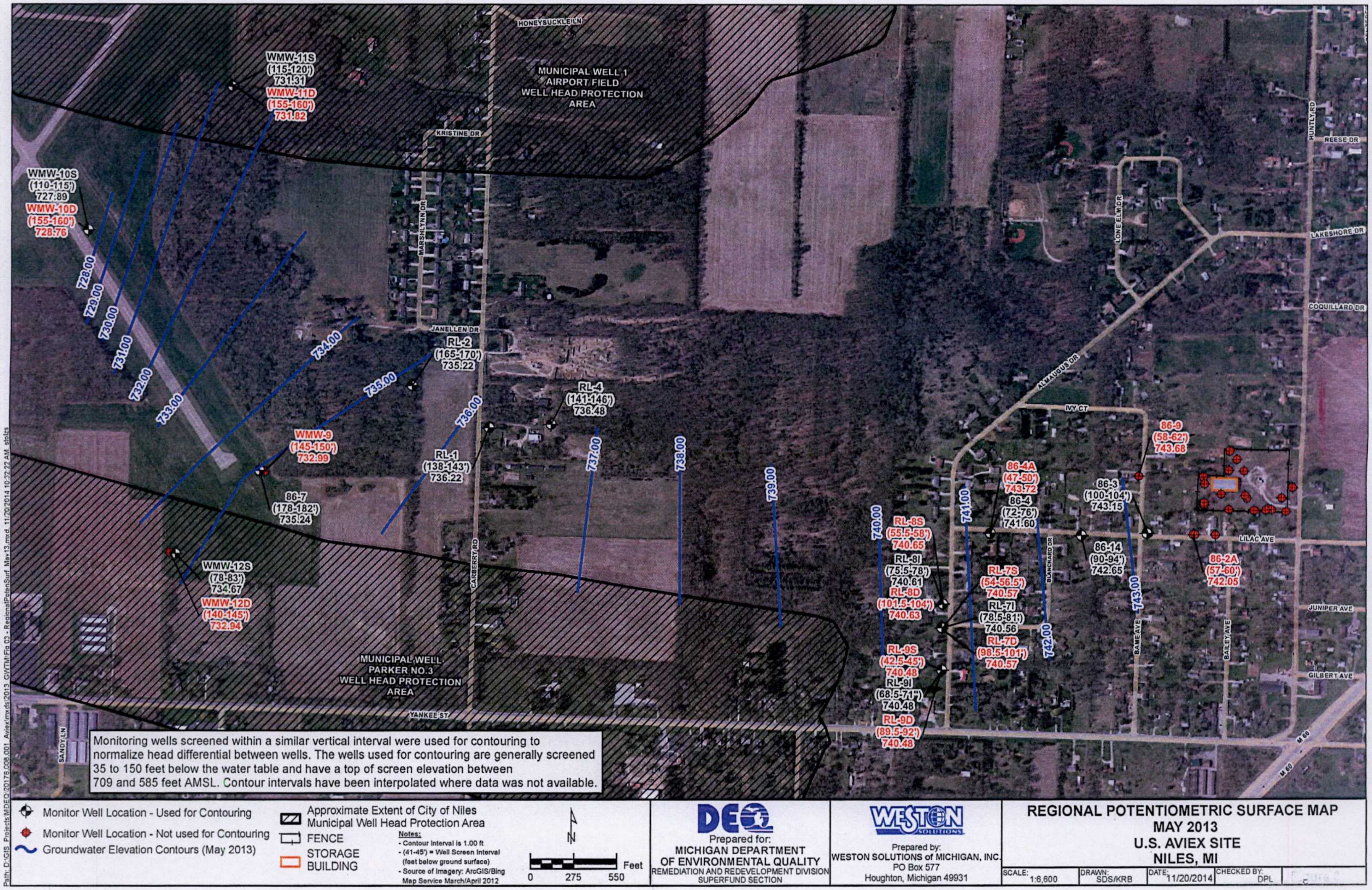
Prepared by:
WESTON SOLUTIONS of MICHIGAN, INC.
PO Box 577
Houghton, Michigan 49931

SITE POTENTIOMETRIC SURFACE MAP
MAY 2013
U.S. AVIEX SITE
NILES, MI

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:1,182	SDS	11/20/2014	DPL	Figure 5

Path: D:\GIS_Projects\MDEQ\2015\058.001_Aviex\mxds\2013_GWTM\Fig 05 - SitePotenSurface_May13.mxd 11/20/2014 10:37:01 AM sitez

Figure 5



HONEYSUCKLE LN
MUNICIPAL WELL 1 AIRPORT FIELD WELL HEAD PROTECTION AREA
KRISTINE DR
MARSHALL DR
JANELLEN DR
CARBERRY RD
YANKEE ST
SANDY LN
ALMAGUS DR
IVY CT
LONE ELM DR
HUNTLY RD
REESE DR
LAKESHORE DR
COQUILLARD DR
LILAC AVE
JUNIPER AVE
GILBERT AVE
BAME AVE
BAILEY AVE
BLANCHARD DR
M 60
MUNICIPAL WELL PARKER NO.3 WELL HEAD PROTECTION AREA
WMW-11S (115-120') 731.31
WMW-11D (155-160') 731.82
WMW-10S (110-115') 727.89
WMW-10D (155-160') 728.76
RL-2 (165-170') 735.22
RL-4 (141-146') 736.48
RL-1 (138-143') 736.22
WMW-9 (145-150') 732.99
86-7 (178-182') 735.24
WMW-12S (78-83') 734.67
WMW-12D (140-145') 732.94
RL-8S (55.5-58') 740.65
RL-8I (75.5-78') 740.61
RL-8D (101.5-104') 740.63
RL-9S (42.5-45') 740.48
RL-9I (68.5-71') 740.48
RL-9D (89.5-92') 740.48
RL-7S (54-56.5') 740.57
RL-7I (78.5-81') 740.56
RL-7D (98.5-101') 740.57
86-4A (47-50') 743.72
86-4 (72-76') 741.60
86-3 (100-104') 743.15
86-9 (58-62') 743.68
86-14 (90-94') 742.65
86-2A (57-60') 742.05
728.00
729.00
730.00
731.00
732.00
733.00
734.00
735.00
736.00
737.00
738.00
739.00
740.00
741.00
742.00
743.00
Monitoring wells screened within a similar vertical interval were used for contouring to normalize head differential between wells. The wells used for contouring are generally screened 35 to 150 feet below the water table and have a top of screen elevation between 709 and 585 feet AMSL. Contour intervals have been interpolated where data was not available.
Monitor Well Location - Used for Contouring
Monitor Well Location - Not used for Contouring
Groundwater Elevation Contours (May 2013)
Approximate Extent of City of Niles Municipal Well Head Protection Area
FENCE
STORAGE BUILDING
Notes:
- Contour interval is 1.00 ft
- (41-45') = Well Screen Interval (feet below ground surface)
- Source of Imagery: ArcGIS/Bing Map Service March/April 2012
N
0 275 550 Feet
DEQ
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION
SUPERFUND SECTION
WESTON SOLUTIONS
Prepared by:
WESTON SOLUTIONS of MICHIGAN, INC.
PO Box 577
Houghton, Michigan 49931
REGIONAL POTENTIOMETRIC SURFACE MAP
MAY 2013
U.S. AVIEX SITE
NILES, MI
SCALE: 1:6,600
DRAWN: SDS/KRB
DATE: 11/20/2014
CHECKED BY: DPL

Figure 6

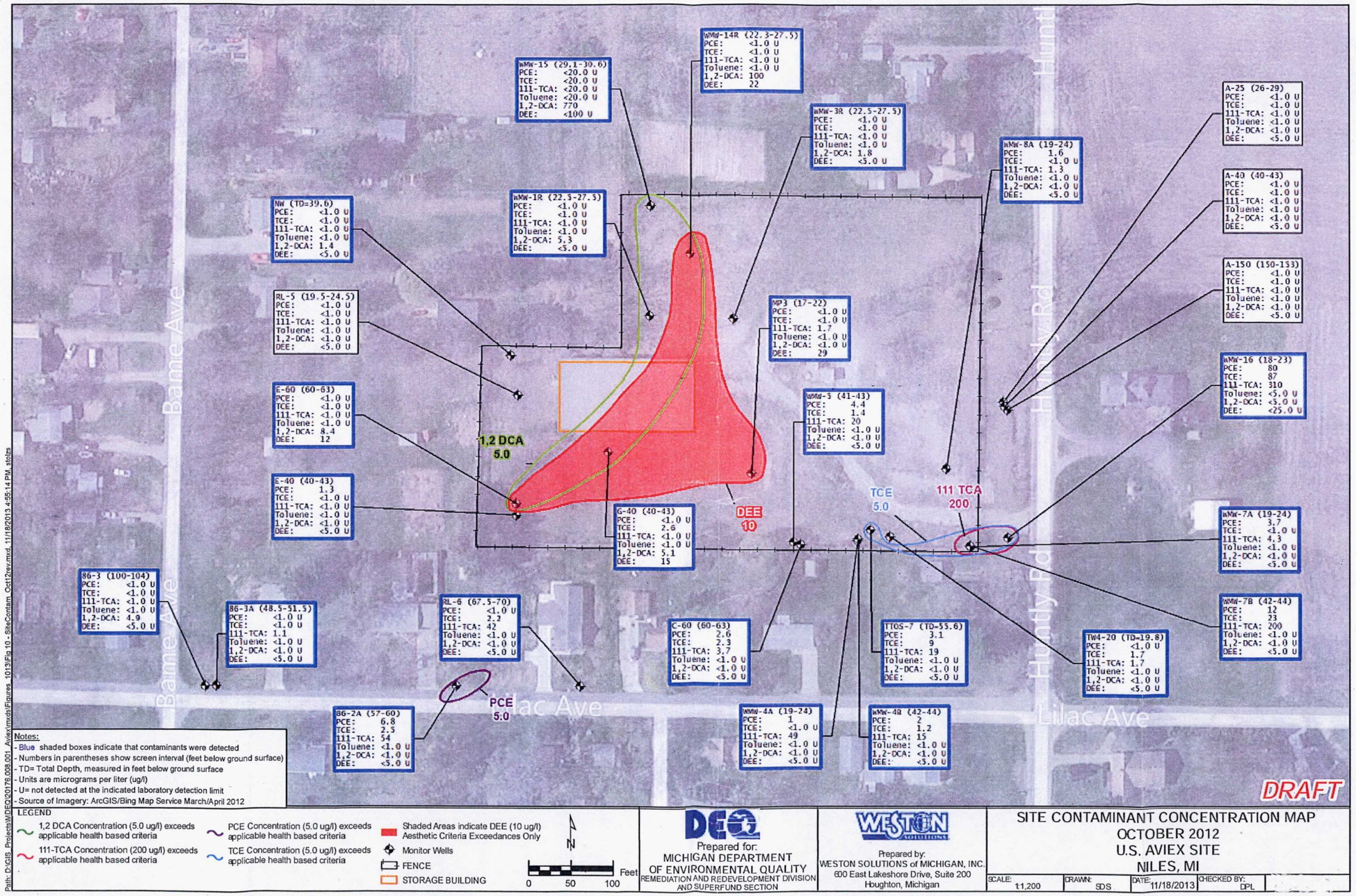

Bame Ave
Hunty Rd
Lilac Ave
wMW-15 (29.1-30.6)
PCE: <20.0 U
TCE: <20.0 U
111-TCA: <20.0 U
Toluene: <20.0 U
1,2-DCA: 770
DEE: <100 U
wMW-14R (22.3-27.5)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 100
DEE: 22
wMW-3R (22.5-27.5)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 1.8
DEE: <5.0 U
wMW-8A (19-24)
PCE: 1.6
TCE: <1.0 U
111-TCA: 1.3
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
A-25 (26-29)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
A-40 (40-43)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
A-150 (150-153)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
wMW-16 (18-23)
PCE: 80
TCE: 87
111-TCA: 310
Toluene: <5.0 U
1,2-DCA: <5.0 U
DEE: <25.0 U
NW (TD=39.6)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 1.4
DEE: <5.0 U
wMW-1R (22.5-27.5)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 5.3
DEE: <5.0 U
RL-5 (19.5-24.5)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
MP3 (17-22)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: 1.7
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: 29
wMW-5 (41-43)
PCE: 4.4
TCE: 1.4
111-TCA: 20
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
E-60 (60-63)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 8.4
DEE: 12
1,2 DCA
5.0
E-40 (40-43)
PCE: 1.3
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
G-40 (40-43)
PCE: <1.0 U
TCE: 2.6
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 5.1
DEE: 15
DEE
10
TCE
5.0
111 TCA
200
wMW-7A (19-24)
PCE: 3.7
TCE: <1.0 U
111-TCA: 4.3
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
wMW-7B (42-44)
PCE: 12
TCE: 23
111-TCA: 200
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
TMW-20 (TD=19.8)
PCE: <1.0 U
TCE: 1.7
111-TCA: 1.7
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
86-3 (100-104)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 4.9
DEE: <5.0 U
86-3A (48.5-51.5)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: 1.1
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
RL-6 (67.5-70)
PCE: <1.0 U
TCE: 2.2
111-TCA: 42
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
C-60 (60-63)
PCE: 2.6
TCE: 2.3
111-TCA: 3.7
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
TTOS-7 (TD=55.6)
PCE: 3.1
TCE: 9
111-TCA: 19
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
PCE
5.0
86-2A (57-60)
PCE: 6.8
TCE: 2.5
111-TCA: 54
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
wMW-4A (19-24)
PCE: 1
TCE: <1.0 U
111-TCA: 49
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
wMW-4B (42-44)
PCE: 2
TCE: 1.2
111-TCA: 15
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <3.0 U
DRAFT
Notes:
- Blue shaded boxes indicate that contaminants were detected
- Numbers in parentheses show screen interval (feet below ground surface)
- TD= Total Depth, measured in feet below ground surface
- Units are micrograms per liter (ug/l)
- U= not detected at the indicated laboratory detection limit
- Source of Imagery: ArcGIS/Bing Map Service March/April 2012
LEGEND
1,2 DCA Concentration (5.0 ug/l) exceeds applicable health based criteria
111-TCA Concentration (200 ug/l) exceeds applicable health based criteria
PCE Concentration (5.0 ug/l) exceeds applicable health based criteria
TCE Concentration (5.0 ug/l) exceeds applicable health based criteria
Shaded Areas indicate DEE (10 ug/l) Aesthetic Criteria Exceedances Only
Monitor Wells
FENCE
STORAGE BUILDING
N
0 50 100 Feet
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION AND SUPERFUND SECTION
Prepared by:
WESTON SOLUTIONS of MICHIGAN, INC.
600 East Lakeshore Drive, Suite 200
Houghton, Michigan
SITE CONTAMINANT CONCENTRATION MAP
OCTOBER 2012
U.S. AVIEX SITE
NILES, MI
SCALE: 1:1,200
DRAWN: SDS
DATE: 11/18/2013
CHECKED BY: DPL
Path: D:\GIS_Projects\WDEQ\20176.008.001_Aviex\mxds\Figures_1013\Fig.10 - SiteContam_Oct12rev.mxd, 11/18/2013 4:55:14 PM, stolzs

Figure 7

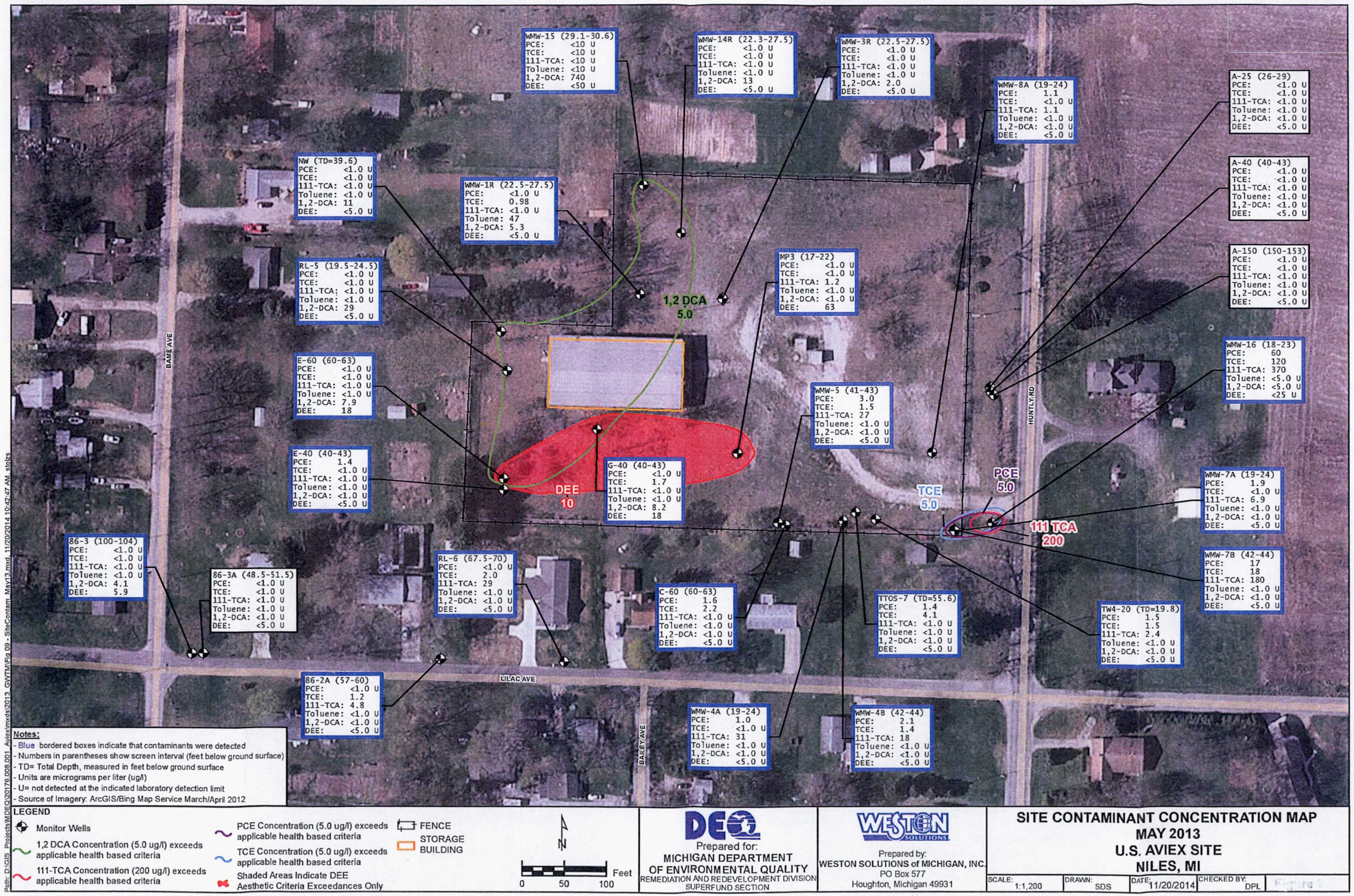

WMW-15 (29.1-30.6)
PCE: <10 U
TCE: <10 U
111-TCA: <10 U
Toluene: <10 U
1,2-DCA: 740
DEE: <50 U
WMW-14R (22.3-27.5)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 13
DEE: <5.0 U
WMW-3R (22.5-27.5)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 2.0
DEE: <5.0 U
WMW-8A (19-24)
PCE: 1.1
TCE: <1.0 U
111-TCA: 1.1
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
A-25 (26-29)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
NW (TD=39.6)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 11
DEE: <5.0 U
WMW-1R (22.5-27.5)
PCE: <1.0 U
TCE: 0.98
111-TCA: <1.0 U
Toluene: 47
1,2-DCA: 5.3
DEE: <5.0 U
A-40 (40-43)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
MP3 (17-22)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: 1.2
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: 63
A-150 (150-153)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
RL-5 (19.5-24.5)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 29
DEE: <5.0 U
1,2 DCA 5.0
WMW-16 (18-23)
PCE: 60
TCE: 120
111-TCA: 370
Toluene: <5.0 U
1,2-DCA: <5.0 U
DEE: <25 U
E-60 (60-63)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 7.9
DEE: 18
WMW-5 (41-43)
PCE: 3.0
TCE: 1.5
111-TCA: 27
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
E-40 (40-43)
PCE: 1.4
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
G-40 (40-43)
PCE: <1.0 U
TCE: 1.7
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 8.2
DEE: 18
DEE 10
TCE 5.0
PCE 5.0
111 TCA 200
WMW-7A (19-24)
PCE: 1.9
TCE: <1.0 U
111-TCA: 6.9
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
WMW-7B (42-44)
PCE: 17
TCE: 18
111-TCA: 180
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
86-3 (100-104)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 4.1
DEE: 5.9
86-3A (48.5-51.5)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
RL-6 (67.5-70)
PCE: <1.0 U
TCE: 2.0
111-TCA: 29
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
C-60 (60-63)
PCE: 1.6
TCE: 2.2
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
TTOS-7 (TD=55.6)
PCE: 1.4
TCE: 4.1
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
TW4-20 (TD=19.8)
PCE: 1.5
TCE: 1.5
111-TCA: 2.4
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
86-2A (57-60)
PCE: <1.0 U
TCE: 1.2
111-TCA: 4.8
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
WMW-4A (19-24)
PCE: 1.0
TCE: <1.0 U
111-TCA: 31
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
WMW-4B (42-44)
PCE: 2.1
TCE: 1.4
111-TCA: 18
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
BAIME AVE
LILAC AVE
BAILEY AVE
HUNTLY RD
Notes:
- Blue bordered boxes indicate that contaminants were detected
- Numbers in parentheses show screen interval (feet below ground surface)
- TD= Total Depth, measured in feet below ground surface
- Units are micrograms per liter (ug/l)
- U= not detected at the indicated laboratory detection limit
- Source of Imagery: ArcGIS/Bing Map Service March/April 2012
LEGEND
Monitor Wells
1,2 DCA Concentration (5.0 ug/l) exceeds applicable health based criteria
111-TCA Concentration (200 ug/l) exceeds applicable health based criteria
PCE Concentration (5.0 ug/l) exceeds applicable health based criteria
TCE Concentration (5.0 ug/l) exceeds applicable health based criteria
Shaded Areas Indicate DEE Aesthetic Criteria Exceedances Only
FENCE
STORAGE BUILDING
N
0 50 100 Feet
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION
SUPERFUND SECTION
Prepared by:
WESTON SOLUTIONS of MICHIGAN, INC.
PO Box 577
Houghton, Michigan 49931
SITE CONTAMINANT CONCENTRATION MAP
MAY 2013
U.S. AVIEX SITE
NILES, MI
SCALE: 1:1,200
DRAWN: SDS
DATE: 11/20/2014
CHECKED BY: DPL
Figure 8
Path: D:\GIS_Projects\MDEQ\20176.008.001_Aviex\mxds\2013_GW\TA\Fig 09 - SiteContam_May13.mxd 11/20/2014 10:42:47 AM stolzs

Figure 8

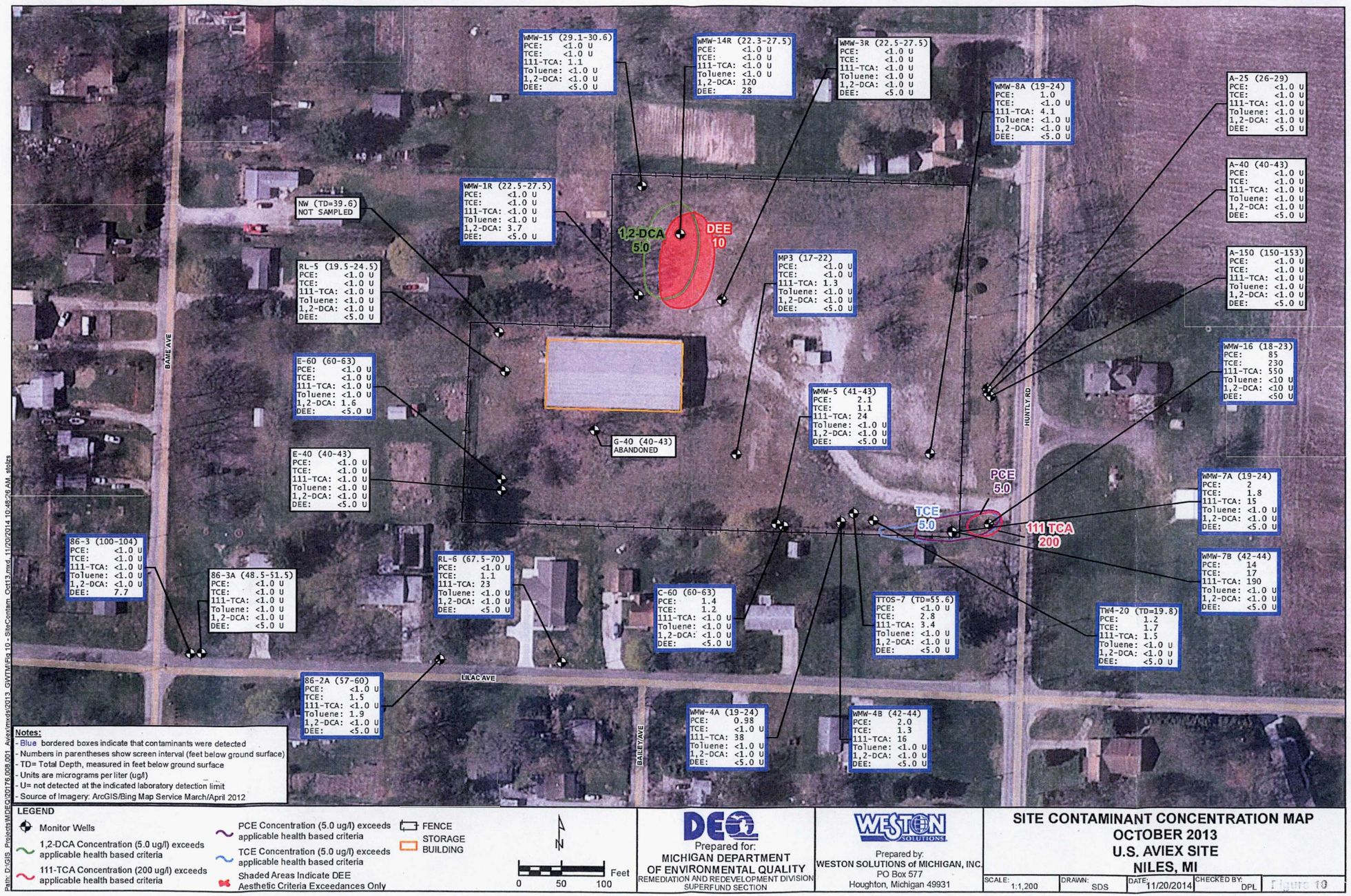

WMW-15 (29.1-30.6)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: 1.1
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
WMW-14R (22.3-27.5)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 120
DEE: 28
WMW-3R (22.5-27.5)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
WMW-8A (19-24)
PCE: 1.0
TCE: <1.0 U
111-TCA: 4.1
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
A-25 (26-29)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
A-40 (40-43)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
A-150 (150-153)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
WMW-1R (22.5-27.5)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 3.7
DEE: <5.0 U
NW (TD=39.6)
NOT SAMPLED
1,2-DCA 5.0
DEE 10
MP3 (17-22)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: 1.3
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
RL-5 (19.5-24.5)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
WMW-16 (18-23)
PCE: 85
TCE: 230
111-TCA: 550
Toluene: <10 U
1,2-DCA: <10 U
DEE: <50 U
E-60 (60-63)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 1.6
DEE: <5.0 U
WMW-5 (41-43)
PCE: 2.1
TCE: 1.1
111-TCA: 24
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
G-40 (40-43)
ABANDONED
E-40 (40-43)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
PCE 5.0
TCE 5.0
111 TCA 200
WMW-7A (19-24)
PCE: 2
TCE: 1.8
111-TCA: 15
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
WMW-7B (42-44)
PCE: 14
TCE: 17
111-TCA: 190
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
86-3 (100-104)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: 7.7
86-3A (48.5-51.5)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
RL-6 (67.5-70)
PCE: <1.0 U
TCE: 1.1
111-TCA: 23
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
C-60 (60-63)
PCE: 1.4
TCE: 1.2
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
TTOS-7 (TD=55.6)
PCE: <1.0 U
TCE: 2.8
111-TCA: 3.4
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
TW4-20 (TD=19.8)
PCE: 1.2
TCE: 1.7
111-TCA: 1.5
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
86-2A (57-60)
PCE: <1.0 U
TCE: 1.5
111-TCA: <1.0 U
Toluene: 1.9
1,2-DCA: <1.0 U
DEE: <5.0 U
WMW-4A (19-24)
PCE: 0.98
TCE: <1.0 U
111-TCA: 38
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
WMW-4B (42-44)
PCE: 2.0
TCE: 1.3
111-TCA: 16
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
BAME AVE
LILAC AVE
BAILEY AVE
HUNTLY RD
Notes:
- Blue bordered boxes indicate that contaminants were detected
- Numbers in parentheses show screen interval (feet below ground surface)
- TD= Total Depth, measured in feet below ground surface
- Units are micrograms per liter (ug/l)
- U= not detected at the indicated laboratory detection limit
- Source of Imagery: ArcGIS/Bing Map Service March/April 2012
LEGEND
Monitor Wells
1,2-DCA Concentration (5.0 ug/l) exceeds applicable health based criteria
111-TCA Concentration (200 ug/l) exceeds applicable health based criteria
PCE Concentration (5.0 ug/l) exceeds applicable health based criteria
TCE Concentration (5.0 ug/l) exceeds applicable health based criteria
Shaded Areas Indicate DEE Aesthetic Criteria Exceedances Only
FENCE
STORAGE BUILDING
N
0 50 100 Feet
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION
SUPERFUND SECTION
Prepared by:
WESTON SOLUTIONS of MICHIGAN, INC.
PO Box 577
Houghton, Michigan 49931
SITE CONTAMINANT CONCENTRATION MAP
OCTOBER 2013
U.S. AVIEX SITE
NILES, MI
SCALE: 1:1,200
DRAWN: SDS
DATE: 11/20/2014
CHECKED BY: DPL
Figure 10
Path: D:\GIS_Projects\MDEQ\90178.000.001 Aviex\mxds\2013_GW TM\Fig 10 - SiteContam_Oct13.mxd 11/20/2014 10:48:16 AM stolzs

Figure 9

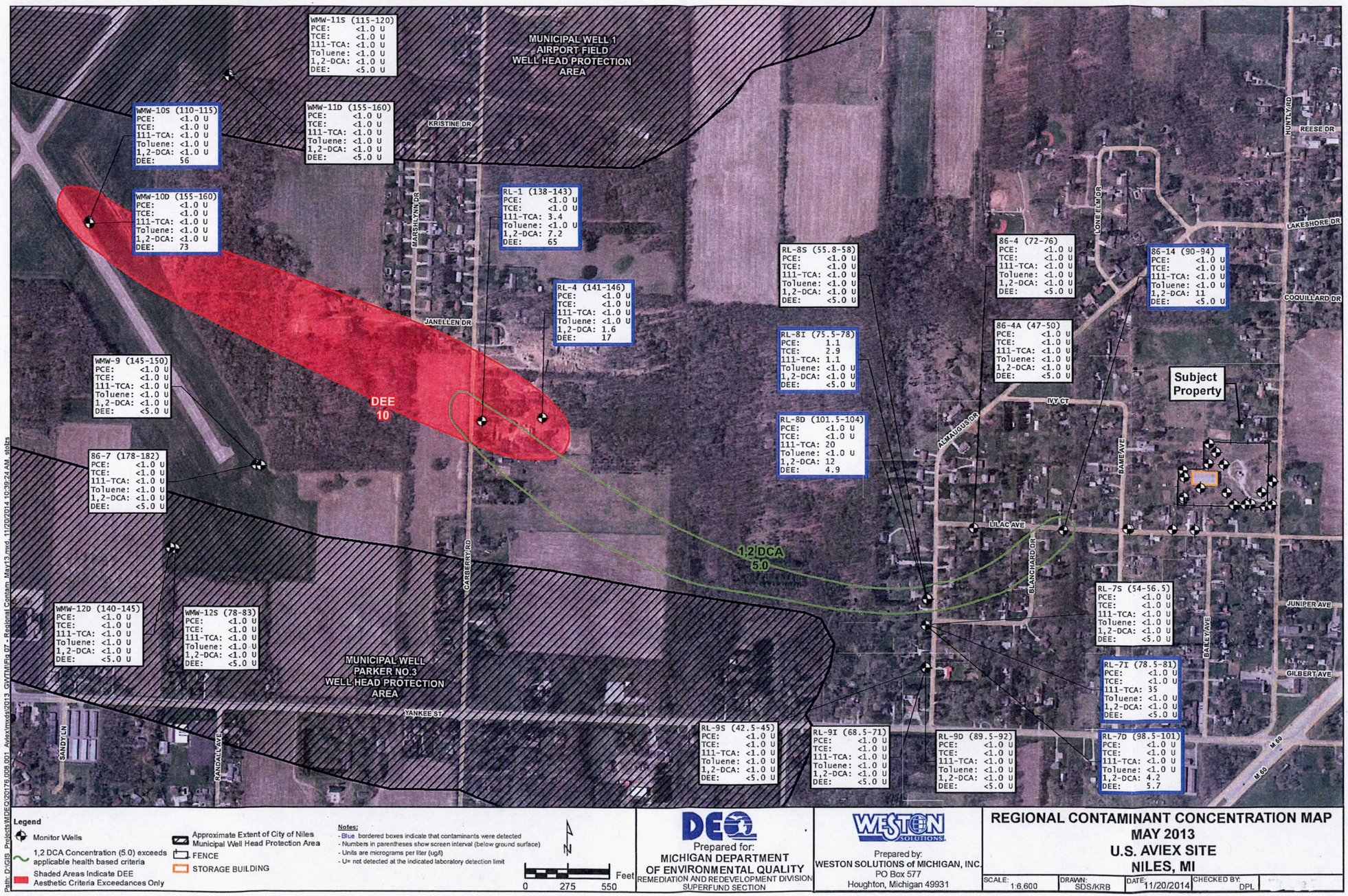

WMW-11S (115-120)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
MUNICIPAL WELL 1
AIRPORT FIELD
WELL HEAD PROTECTION
AREA
WMW-10S (110-115)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: 56
WMW-11D (155-160)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
KRISTINE DR
WMW-10D (155-160)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: 73
MARSHLYNN DR
RL-1 (138-143)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: 3.4
Toluene: <1.0 U
1,2-DCA: 7.2
DEE: 65
RL-4 (141-146)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 1.6
DEE: 17
JANELLEN DR
RL-8S (55.8-58)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
86-4 (72-76)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
LONE ELM DR
HUNTLY RD
REESE DR
LAKESHORE DR
86-14 (90-94)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 11
DEE: <5.0 U
COQUILLARD DR
WMW-9 (145-150)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
DEE
10
RL-8I (75.5-78)
PCE: 1.1
TCE: 2.9
111-TCA: 1.1
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
86-4A (47-50)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
Subject
Property
IVY CT
RL-8D (101.5-104)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: 20
Toluene: <1.0 U
1,2-DCA: 12
DEE: 4.9
ALMAUGUSTA DR
BAKE AVE
LILAC AVE
BLANCHARD DR
86-7 (178-182)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
1,2 DCA
5.0
RL-7S (54-56.5)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
JUNIPER AVE
BAILEY AVE
CARBERRY RD
WMW-12D (140-145)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
WMW-12S (78-83)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
RL-7I (78.5-81)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: 35
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
GILBERT AVE
MUNICIPAL WELL
PARKER NO.3
WELL HEAD PROTECTION
AREA
YANKEE ST
SANDY LN
RANDALL AVE
RL-9S (42.5-45)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
RL-9I (68.5-71)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
RL-9D (89.5-92)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
RL-7D (98.5-101)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 4.2
DEE: 5.7
M-60
M-60
Legend
Monitor Wells
1,2 DCA Concentration (5.0) exceeds applicable health based criteria
Shaded Areas Indicate DEE Aesthetic Criteria Exceedances Only
Approximate Extent of City of Niles Municipal Well Head Protection Area
FENCE
STORAGE BUILDING
Notes:
- Blue bordered boxes indicate that contaminants were detected
- Numbers in parentheses show screen interval (below ground surface)
- Units are micrograms per liter (ug/l)
- U= not detected at the indicated laboratory detection limit
N
0 275 550 Feet
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION
SUPERFUND SECTION
Prepared by:
WESTON SOLUTIONS of MICHIGAN, INC.
PO Box 577
Houghton, Michigan 49931
REGIONAL CONTAMINANT CONCENTRATION MAP
MAY 2013
U.S. AVIEX SITE
NILES, MI
SCALE: 1:6,600
DRAWN: SDS/KRB
DATE: 11/20/2014
CHECKED BY: DPL
Path: P:\GIS Projects\MDEQ\20179,008.001 Aviex\mxd\2013_GWTMRFig 07 - Regional Contam. May13.mxd, 11/20/2014 10:39:24 AM, sdyle

Figure 10

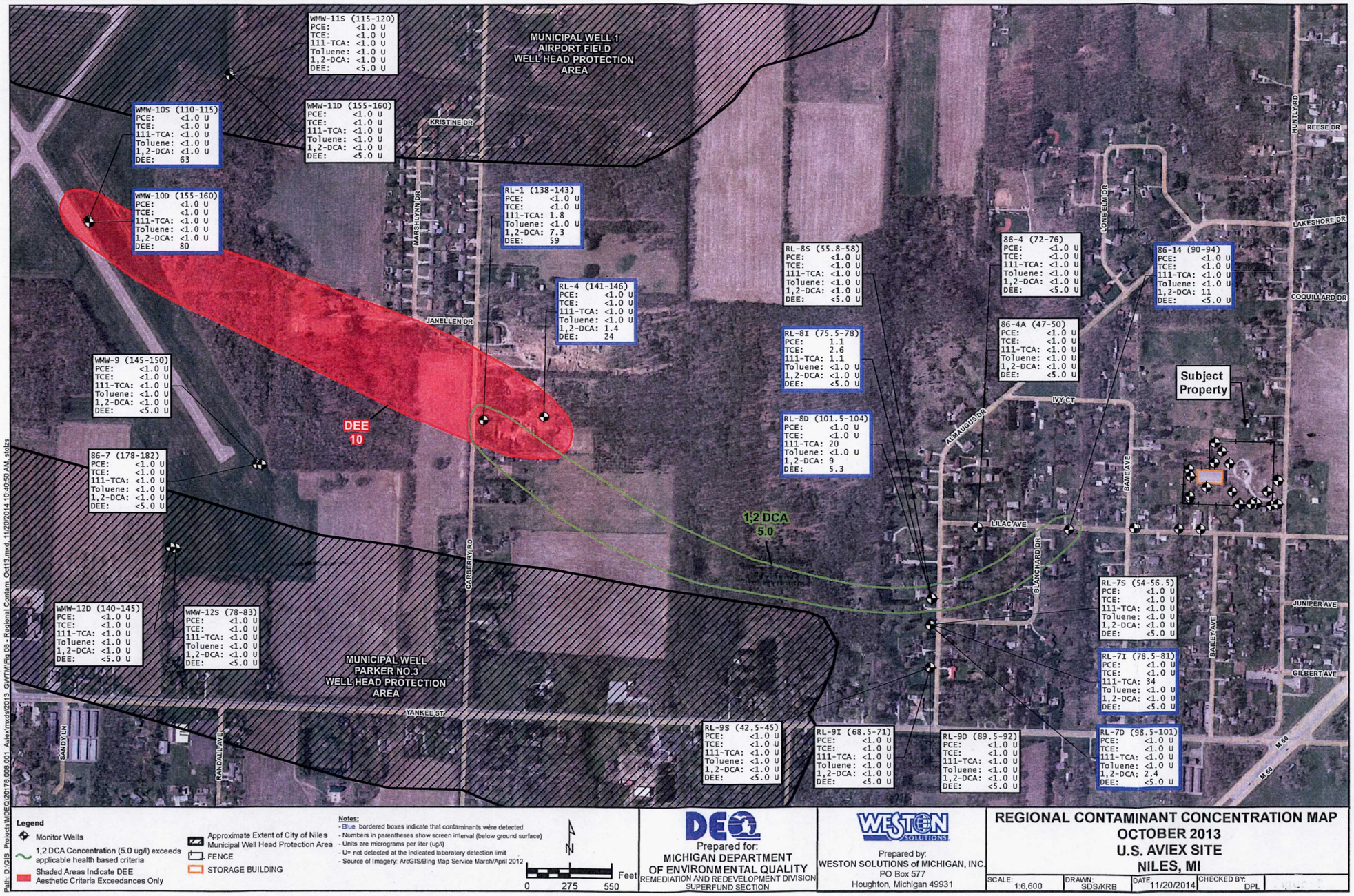

WMW-11S (115-120)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
MUNICIPAL WELL 1
AIRPORT FIELD
WELL HEAD PROTECTION
AREA
WMW-10S (110-115)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: 63
WMW-11D (155-160)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
KRISTINE DR
WMW-10D (155-160)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: 80
MARSHLYNN DR
RL-1 (138-143)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: 1.8
Toluene: <1.0 U
1,2-DCA: 7.3
DEE: 59
RL-4 (141-146)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 1.4
DEE: 24
JANELLEN DR
WMW-9 (145-150)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
DEE 10
86-7 (178-182)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
WMW-12D (140-145)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
WMW-12S (78-83)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
CARBERRY RD
MUNICIPAL WELL
PARKER NO.3
WELL HEAD PROTECTION
AREA
YANKEE ST
SANDY LN
RANDALL AVE
RL-8S (55.8-58)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
RL-8I (75.5-78)
PCE: 1.1
TCE: 2.6
111-TCA: 1.1
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
RL-8D (101.5-104)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: 20
Toluene: <1.0 U
1,2-DCA: 9
DEE: 5.3
1,2 DCA
5.0
RL-9S (42.5-45)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
RL-9I (68.5-71)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
RL-9D (89.5-92)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
86-4 (72-76)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
LONE ELM DR
86-14 (90-94)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 11
DEE: <5.0 U
HUNTLY RD
REESE DR
LAKESHORE DR
COQUILLARD DR
86-4A (47-50)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
Subject Property
IVY CT
ALMAGUS DR
BAILEY AVE
LILAC AVE
BLANCHARD DR
RL-7S (54-56.5)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
RL-7I (78.5-81)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: 34
Toluene: <1.0 U
1,2-DCA: <1.0 U
DEE: <5.0 U
RL-7D (98.5-101)
PCE: <1.0 U
TCE: <1.0 U
111-TCA: <1.0 U
Toluene: <1.0 U
1,2-DCA: 2.4
DEE: <5.0 U
JUNIPER AVE
GILBERT AVE
M-60
Legend
Monitor Wells
1,2 DCA Concentration (5.0 ug/l) exceeds applicable health based criteria
Shaded Areas Indicate DEE Aesthetic Criteria Exceedances Only
Approximate Extent of City of Niles Municipal Well Head Protection Area
FENCE
STORAGE BUILDING
Notes:
- Blue bordered boxes indicate that contaminants were detected
- Numbers in parentheses show screen interval (below ground surface)
- Units are micrograms per liter (ug/l)
- U= not detected at the indicated laboratory detection limit
- Source of Imagery: ArcGIS/Bing Map Service March/April 2012
N
0 275 550 Feet
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION
SUPERFUND SECTION
Prepared by:
WESTON SOLUTIONS of MICHIGAN, INC.
PO Box 577
Houghton, Michigan 49931
REGIONAL CONTAMINANT CONCENTRATION MAP
OCTOBER 2013
U.S. AVIEX SITE
NILES, MI
SCALE: 1:6,600
DRAWN: SDS/KRB
DATE: 11/20/2014
CHECKED BY: DPL
Path: D:\GIS_Projects\MDEQ\20176.008.001_Aviex\mxds\2013_GW\MXD\Fig 08 - Regional Contam_Oct13.mxd 11/20/2014 10:40:50 AM stolzs

Figure 11

WEST
A

EAST
A'

Carberry Road

Tyler Memorial Airport

RL-2

RL-1

Carberry Road

Bame Avenue

U.S. Aviex Site

E40/60

WMW-8A/8B

MP3

A-25/40/150

RL-7S/7I/7D

86-3/3A/3B

WMW-10S/10D

111-TCA=1.7 ug/L

111-TCA=1.0 ug/L

PCE=1.5 ug/L

PCE=2.0 ug/L

1,2-DCA=10 ug/L

111-TCA=37 ug/L

1,2-DCA=2.9 ug/L

1,2-DCA=4.8 ug/L

DEE=74 ug/L

111-TCA=3.5 ug/L

1,2-DCA=10 ug/L

10

5

DEE=21 ug/L

111-TCA=3.2 ug/L

DEE=23 ug/L

ELEVATION ABOVE MEAN SEA LEVEL (MSL)

800
780
760
740
720
700
680
660
640
620
600
580
560
540
520

—5.0 PCE CONCENTRATION (ug/L) EXCEEDS APPLICABLE CRITERIA

—200 1,1,1-TCA CONCENTRATION (ug/L) EXCEEDS APPLICABLE CRITERIA

—5.0 1,2-DCA CONCENTRATION (ug/L) EXCEEDS APPLICABLE CRITERIA

—10 DEE CONCENTRATION (ug/L) EXCEEDS APPLICABLE AESTHETIC CRITERIA

COLDWATER SHALE

LEGEND

APPROXIMATE POTENTIOMETRIC SURFACE ELEVATION (FEET AMSL)

CL - OBSERVED AND INFERRED INORGANIC CLAY

COLDWATER SHALE - INFERRED MISSISSIPPIAN AGE BEDROCK

PERMANENT MONITOR WELL SCREEN INTERVAL (FT BGS)

VERTICAL 40'

0' 800'

APPROXIMATE SCALE

HMI\AVIEXIII\ | Designed By: DPL | Drawn By: DPL | Checked By:

Figure 12

WESTON SOLUTIONS
600 EAST LAKESHORE DRIVE
SUITE 200
HOUGHTON, MICHIGAN
49931

GEOLOGIC CROSS-SECTION A-A'

U.S. AVIEX SITE - APRIL 2012
NILES, MICHIGAN

POOL

6' CHAIN LINK FENCE WITH 3 STRAND BARBED WIRE

EXCAVATION LIMITS

FORMER GROUNDWATER SYSTEM BUILDINGS

WAREHOUSE/STORAGE BUILDING

FORMER SPARGE SYSTEM TRAILER

UNDERGROUND ELECTRICAL CONDUIT

UNDERGROUND TELEPHONE CONDUIT

UNDERGROUND SPARGE SYSTEM PIPING

EW5 VAULT

GATE

ROAD

HUNTLY

LILAC

AVENUE

SCALE 0 80'

LEGEND

- TREE LINE
- FENCE LINE/FORMER AVIEX FACILITY
- UNDERGROUND UTILITY – TELEPHONE AND ELECTRIC (APPROXIMATE LOCATION)
- UNDERGROUND UTILITY – SPARGE SYSTEM PIPING (APPROXIMATE LOCATION)
- TELEPHONE POLE
- PILOT STUDY BORING LOCATION
- PILOT STUDY WELL LOCATION
- 86-7 – EXISTING (HISTORICAL) WELL LOCATION
- WMW-9 – WESTON MONITOR WELL LOCATIONS (INSTALLED MAY – AUGUST 2003)
- WMW13 – WESTON MONITOR WELL LOCATIONS (INSTALLED JANUARY 2004)
- SPARGE WELLS
- MDEQ –GEOPROBE BORING LOCATION
- MDEQ –GEOPROBE BORING LOCATION MAY 2003

NO.	DATE	APPR.	REVISION

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION SUPERFUND SECTION
Niles Michigan

WESTON SOLUTIONS
HOUGHTON MICHIGAN

		DATE
CHECKED	M.M.B.	11/13
DES. ENG.	M.M.B.	11/13
PROJ. ENG.	M.M.B.	11/13
PROJ. MGR.	D.P.L.	11/13
APPROVED	D.P.L.	11/13
APPROVED		

CLIENT APPROVALS — DATE

ISSUED FOR — DATE

OZONE/AIR SPARGE SYSTEM LAYOUT AND EXCAVATION LIMITS

DRAWN	D.P.L.	DATE	NOV. 2013
SCALE	1"=60'	W.O. NO.	20176.008.001.0010

Figure 13

\\FGLREB\dwg 11/15/2013 2:39:59 PM

Table 6

MONITORING POINTS AND RECOMMENDED SAMPLING FREQUENCY
U.S. Aviex Site
Niles, Michigan

Monitoring Well	Screened Interval (ft bgs)	Recommended Sampling Frequency	Sampled By	Sampling Pump Type	Recommended Analytes
82-3	-	Water Level Only	-	-	-
86-1A	40-43	Water Level Only	-	-	-
86-2	133-137	Water Level Only	-	-	-
86-2A	57-60	Semi-Annual	WESTON	peristaltic	VOCs + MNA
86-2B	79-82	Water Level Only	-	-	-
86-3	100-104	Semi-Annual	WESTON	bladder	VOCs
86-3A	48.5-51.5	Semi-Annual	WESTON	peristaltic	VOCs
86-3B	68-71	Water Level Only	-	-	-
86-4	72-76	Semi-Annual	MDEQ	bladder	VOCs
86-4A	47-50	Semi-Annual	MDEQ	bladder	VOCs
86-7	178-182	Semi-Annual	MDEQ	dedicated bladder	VOCs + MNA
86-9	58-62	Water Level Only	-	-	-
86-14	90-94	Semi-Annual	MDEQ	bladder	VOCs
A-25	26-29	Semi-Annual	WESTON	-	VOCs + MNA
A-40	40-43	Semi-Annual	WESTON	-	VOCs + MNA
A-150	150-153	Semi-Annual	WESTON	-	VOCs + MNA
C-60	60-63	Semi-Annual	WESTON	peristaltic	VOCs
E-40	40-43	Semi-Annual	WESTON	peristaltic	VOCs + MNA
E-60	60-63	Semi-Annual	WESTON	peristaltic	VOCs + MNA
G-40	40-43	Semi-Annual	WESTON	peristaltic	VOCs
MP-3	17-22	Semi-Annual	WESTON	peristaltic	VOCs
MP-4	27-32	Water Level Only	-	-	-
NW	-	Semi-Annual	WESTON	peristaltic	VOCs + MNA
RL-1	138-143	Semi-Annual	MDEQ	bladder	VOCs + MNA
RL-2	165-170	Semi-Annual	MDEQ	dedicated bladder	VOCs + MNA
RL-4	141-146	Semi-Annual	MDEQ	bladder	VOCs + MNA
RL-5	19.5-24.5	Semi-Annual	WESTON	peristaltic	VOCs + MNA
RL-6	67.5-70	Semi-Annual	WESTON	peristaltic	VOCs
RL-7S	54-56.5	Semi-Annual	MDEQ	bladder	VOCs + MNA
RL-7I	78.5-81	Semi-Annual	MDEQ	bladder	VOCs + MNA
RL-7D	98.5-101	Semi-Annual	MDEQ	bladder	VOCs + MNA
RL-8S	55.5-58	Semi-Annual	MDEQ	bladder	VOCs + MNA
RL-8I	75.5-78	Semi-Annual	MDEQ	bladder	VOCs + MNA
RL-8D	101.5-104	Semi-Annual	MDEQ	bladder	VOCs + MNA
RL-9S	42.5-45	Semi-Annual	MDEQ	bladder	VOCs + MNA
RL-9I	68.5-71	Semi-Annual	MDEQ	bladder	VOCs + MNA
RL-9D	89.5-92	Semi-Annual	MDEQ	bladder	VOCs + MNA
TTOS-7	-	Semi-Annual	WESTON	peristaltic	VOCs
TW-1-40	-	Water Level Only	-	-	-
TW-4-20	-	Semi-Annual	WESTON	peristaltic	VOCs
WMW-1R	22.5-27.5	Semi-Annual	WESTON	peristaltic	VOCs
WMW-3R	22.5-27.5	Semi-Annual	WESTON	peristaltic	VOCs
WMW-4a	19-24	Semi-Annual	WESTON	peristaltic	VOCs + MNA
WMW-4b	42-44	Semi-Annual	WESTON	peristaltic	VOCs + MNA
WMW-5	41-43	Semi-Annual	WESTON	peristaltic	VOCs + MNA
WMW-7a	19-24	Semi-Annual	WESTON	peristaltic	VOCs
WMW-7b	42-44	Semi-Annual	WESTON	peristaltic	VOCs
WMW-8a	19-24	Semi-Annual	WESTON	peristaltic	VOCs
WMW-8b	41-43	Water Level Only	-	-	-
WMW-9	145-150	Semi-Annual	MDEQ	dedicated bladder	VOCs + MNA
WMW-10S	110-115	Semi-Annual	MDEQ	dedicated bladder	VOCs + MNA
WMW-10D	155-160	Semi-Annual	MDEQ	dedicated bladder	VOCs + MNA
WMW-11S	115-120	Semi-Annual	MDEQ	dedicated bladder	VOCs + MNA
WMW-11D	155-160	Semi-Annual	MDEQ	dedicated bladder	VOCs + MNA
WMW-12S	78-83	Semi-Annual	MDEQ	dedicated bladder	VOCs + MNA
WMW-12D	140-145	Semi-Annual	MDEQ	dedicated bladder	VOCs + MNA
WMW-14R	22.5-27.5	Water Level Only	-	-	-
WMW-15	29.1-30.6	Semi-Annual	WESTON	peristaltic	VOCs
WMW-16	18-23	Semi-Annual	WESTON	peristaltic	VOCs

Notes:

-This table was updated after the September 2004 ROD Amendment. A number of monitoring wells were abandoned and the sampling frequency for the remaining locations was altered.

-MNA parameters were added to the list of analytes in 2012, and the sampling frequency was changed to semi-annual.

Ft bgs - Feet below ground surface
MDEQ - Michigan Department of Environmental Quality
MNA - Monitored natural attenuation
ROD - Record of Decision
VOC - Volatile organic compounds

Table 7

STATIC WATER LEVEL MEASUREMENTS AND MONITORING WELL CONSTRUCTION SUMMARY
U.S. Aviex Site
Niles, Michigan

Monitoring Well	Well Depth (ft bgs)	Top of Casing Elevation (ft AMSL)	Ground Elevation (ft AMSL)	Well Diameter (in)	Screened Interval (ft bgs)	Screen Elevation (ft AMSL)		30-Apr-12		1-Oct-12	
						Top of Screen	Bottom of Screen	Depth to Water (ft btc)	Water Elevation (ft AMSL)	Depth to Water (ft btc)	Water Elevation (ft AMSL)
RL-9S	45.00	774.53	774.82	2.0	42.5-45	732.32	729.82	33.26	741.27	35.37	739.16
RL-9I	71.00	774.43	774.87	2.0	68.5-71	706.37	703.87	33.16	741.27	35.29	739.14
RL-9D	92.00	774.58	774.98	2.0	89.5-92	685.48	682.98	33.30	741.28	35.41	739.17
TTOS-7	55.60	760.90	761.23	2.0	-	-	-	16.19	744.71	18.41	742.49
TW-1-40	63.50	765.14	765.39	2.0	-	-	-	20.60	744.54	22.83	742.31
TW-4-20	19.75	760.87	761.11	1.5	-	-	-	16.10	744.77	18.35	742.52
WMW-1	31.85	769.62	769.93	2.0	27-32	743.08	738.08	Abandoned		Abandoned	
WMW-1R	27.50	765.53	765.92	2.0	22.5-27.5	743.42	738.42	19.71	745.82	22.09	743.44
WMW-2 [6,4]	30.11	769.02	769.40	2.0	25-30	744.29	739.29	Abandoned		Abandoned	
WMW-3 [6]	29.70	767.35	767.66	2.0	24-29	742.96	737.96	Abandoned		Abandoned	
WMW-3R	27.50	763.87	764.35	2.0	22.5-27.5	741.85	736.85	18.95	744.92	21.23	742.64
WMW-4a	24.20	761.38	761.64	1.0	19-24	742.44	737.44	16.65	744.73	18.89	742.49
WMW-4b	44.30	761.39	761.64	1.0	42-44	719.34	717.34	16.70	744.69	18.89	742.50
WMW-5	43.50	763.07	763.32	1.0	41-43	721.82	719.82	18.45	744.62	20.65	742.42
WMW-7a	24.05	760.23	760.44	1.0	19-24	741.39	736.39	15.37	744.86	17.60	742.63
WMW-7b	44.10	760.25	760.44	1.0	42-44	718.34	716.34	15.46	744.79	17.69	742.56
WMW-8a	23.70	760.79	761.12	1.0	19-24	742.42	737.42	15.96	744.83	18.21	742.58
WMW-8b	43.00	760.78	761.12	1.0	41-43	720.12	718.12	16.00	744.78	18.23	742.55
WMW-9	150.13	764.44	761.32	2.0	145-150	616.19	611.19	29.72	734.72	32.28	732.16
WMW-10s	120.00	738.84	739.15	2.0	110-115	624.15	619.15	10.67	728.17	12.54	726.30
WMW-10d	160.30	738.67	739.07	2.0	155-160	583.77	578.77	9.62	729.05	13.61	725.06
WMW-11s	119.80	747.99	745.16	2.0	115-120	630.36	625.36	16.34	731.65	19.19	728.80
WMW-11d	160.06	748.16	745.13	2.0	155-160	590.07	585.07	15.94	732.22	18.74	729.42
WMW-12s	83.20	763.87	760.42	2.0	78-83	682.22	677.22	28.05	735.82	31.51	732.36
WMW-12d	144.69	763.85	760.37	2.0	140-145	620.68	615.68	30.47	733.38	32.90	730.95
WMW-13 [6,4]	29.00	768.93	769.32	2.0	24-29	745.32	740.32	Abandoned		Abandoned	
WMW-14 [6,4]	29.50	769.77	770.05	2.0	24.5-29.5	745.55	740.55	Abandoned		Abandoned	
WMW-14R	27.50	765.58	766.14	2.0	22.5-27.5	743.64	738.64	19.32	746.26	23.30	742.28
WMW-15 [6]	30.60	768.07	768.36	1.0	29.1-30.6	-	-	22.56	745.51	24.69	743.38
WMW-16	23.00	-	-	2.0	18-23	-	-	15.13	NA	17.37	NA
WSB-12 [5]	23.8	767.21	767.39	1.0	18.8-23.8	748.59	743.59	NA	NA	NA	NA
WSB-13 [5]	-	766.74	766.87	1.0	-	-	-	NA	NA	NA	NA
WSB-16 [5]	25.5	768.62	768.79	1.0	20.5-25.5	748.29	743.29	NA	NA	NA	NA
WSB-17 [5]	31.3	767.92	768.23	1.0	26.3-31.3	741.93	736.93	NA	NA	NA	NA
WSB-19 [5]	25.0	767.58	767.92	1.0	20-25	747.92	742.92	NA	NA	NA	NA
WSB-21 [6,5]	24.0	761.88	762.06	1.0	19-24	743.06	738.06	NA	NA	NA	NA
WSB-22 [5]	27.6	763.88	764.16	1.0	22.6-27.6	741.56	736.56	NA	NA	NA	NA

Notes:
-WESTON was unable to locate historic wells 86-5, 86-5A, 86-6, 86-8, 86-10, 86-11, 86-11A, 86-13, 86-15A and 86-16 during the August 2003 survey.
AMSL = Above Mean Sea Level
bgs=below ground surface
btc=below top of casing
ft = Feet
in = Inches
1 = Well depth (bgs) measured from cement slab prior to flush mounting.
2 = Source of screen interval information - Tetra Tech
3 = Source of screen interval information - original boring log
4 = 0.01 feet of free product was detected at least once historically.
5 = Temporary monitor well installed as part of the investigation in the Area North of the Warehouse
6= Free product not measured, was historically detected (at least once) at location.
- = Not measured, not applicable, not available, or insufficient information.

Surveyor: KEBS, Haslett, MI
Date: August 2003
Coordinate System: USGS NAD '83 Datum

Surveyor for WMW-13 & WMW-14:
Williams and Works
Date: March 2004
Coordinate System: USGS NAD '83 Datum

All on-Site monitor wells were flush mounted.
Surveyor: MDEQ
Date: August 2005
Coordinate System: MIGeoRef

TABLE 2
STATIC WATER LEVEL MEASUREMENTS AND MONITORING WELL CONSTRUCTION SUMMARY
U.S. Aviex Site
Niles, Michigan

Monitoring Well	Well Depth (ft bgs)	Top of Casing Elevation (ft AMSL)	Ground Elevation (ft AMSL)	Well Diameter (in)	Screened Interval (ft bgs)	Screen Elevation (ft AMSL)		30-Apr-12		1-Oct-12	
						Top of Screen	Bottom of Screen	Depth to Water (ft btc)	Water Elevation (ft AMSL)	Depth to Water (ft btc)	Water Elevation (ft AMSL)
82-3	24.71	767.44	767.67	2.0	-	-	-	22.38	745.06	24.38	743.06
86-1A	43.69	768.69	769.09	2.0	40-43[3]	728.40	725.40	24.31	744.38	26.52	742.17
86-2	137.72	766.30	766.42	2.0	133-137[3]	632.70	628.70	22.02	744.28	24.23	742.07
86-2A	60.00	766.33	766.42	2.0	57-60[3]	709.42	706.42	22.04	744.29	24.27	742.06
86-2B	81.00	766.25	766.54	2.0	79-82[3]	688.54	685.54	21.96	744.29	24.18	742.07
86-3	102.40	767.45	767.73	4.0	100-104[3]	669.33	665.33	23.46	743.99	25.75	741.70
86-3A	51.60	767.58	767.83	2.0	48.5-51.5[3]	719.23	716.23	26.30	741.28	25.85	741.73
86-3B	64.64	767.38	767.71	2.0	68-71[3]	706.07	703.07	23.40	743.98	25.68	741.70
86-4	72.10	773.85	774.14	4.0	72-76[3]	706.04	702.04	31.35	742.50	33.61	740.24
86-4A	50.80	773.94	774.34	4.0	47-50[3]	726.54	723.54	28.65	745.29	31.26	742.68
86-7	181.50	765.59	762.34	4.0	178-182[3]	584.84	580.84	30.79	734.80	33.36	732.23
86-9	61.00	774.42	774.85	4.0	58-62[3]	717.85	713.85	26.98	747.44	32.67	741.75
86-14	94.40	774.66	775.00	4.0	90-94[2]	684.60	680.60	31.18	743.48	33.45	741.21
A-25	29.33	761.01	761.28	2.0	26-29[3]	734.95	731.95	16.05	744.96	18.35	742.66
A-40	43.00	760.93	761.28	2.0	40-43[3]	721.28	718.28	16.02	744.91	18.30	742.63
A-150[1]	155.50	760.57	760.77	2.0	150-153[3]	608.27	605.27	16.43	744.14	18.65	741.92
C-60	63.70	763.29	763.46	2.0	60-63[3]	702.76	699.76	18.70	744.59	21.85	741.44
E-40	45.60	767.13	767.56	2.0	40-43[3]	724.96	721.96	22.73	744.40	25.95	741.18
E-60	59.62	767.22	767.58	2.0	60-63[3]	710.96	707.96	22.82	744.40	25.30	741.92
G-40	43.50	765.19	765.45	2.0	40-43[3]	724.95	721.95	20.68	744.51	22.91	742.28
MP-3	21.83	762.77	763.17	2.0	17-22	746.34	741.34	18.10	744.67	20.28	742.49
MP-4	31.83	763.04	763.26	2.0	27-32	736.43	731.43	18.42	744.62	20.63	742.41
NW	39.61	767.17	767.61	2.0	-	-	728.00	22.72	744.45	24.95	742.22
RL-1	145.00	784.14	782.03	2.0	138-143	642.03	637.03	46.97	737.17	49.40	734.74
RL-2	173.00	781.84	779.35	2.0	165-170	611.35	606.35	45.86	735.98	48.40	733.44
RL-4	148.00	782.73	781.06	2.0	141-146	638.06	633.06	45.23	737.50	47.68	735.05
RL-5	24.5	764.50	764.71	2.0	19.5-24.5	745.21	740.21	20.05	744.45	22.30	742.20
RL-6	70.0	764.88	765.19	2.0	67.5-70	697.69	695.19	20.48	744.40	22.66	742.22
RL-7S	56.5	770.53	770.83	2.0	54-56.5	716.83	714.33	29.14	741.39	31.29	739.24
RL-7I	81.0	770.13	770.51	2.0	78.5-81	692.01	689.51	28.74	741.39	30.88	739.25
RL-7D	101.0	770.24	770.45	2.0	98.5-101	671.95	669.45	28.84	741.40	31.00	739.24
RL-8S	58.0	772.97	773.68	2.0	55.5-58	718.18	715.68	31.45	741.52	33.65	739.32
RL-8I	78.0	773.00	773.34	2.0	75.5-78	697.84	695.34	31.52	741.48	33.70	739.30
RL-8D	103.0	772.94	773.22	2.0	101.5-104	672.72	670.22	31.46	741.48	33.64	739.30

Notes:

AMSL = Above Mean Sea Level
bgs=below ground surface
btc=below top of casing
ft = Feet
in = Inches
1 = Well depth (bgs) measured from cement slab prior to flush mounting.
2 = Source of screen interval information - Tetra Tech
3 = Source of screen interval information - original boring log
4 = 0.01 feet of free product was detected at least once historically.
5 = Temporary monitor well installed as part of the investigation in the area north of the warehouse
6= Free product not measured, was historically detected (at least once) at location.
- = Not measured, not applicable, not available, or insufficient information.

Surveyor: KEBS, Haslett, MI
Date: August 2003
Coordinate System: USGS NAD '83 Datum

Surveyor for WMW-13 & WMW-14:
Williams and Works
Date: March 2004
Coordinate System: USGS NAD '83 Datum

All on-Site monitor wells were flush mounted.
Surveyor: MDEQ
Date: August 2005
Coordinate System: MIGeoRef

Table 8: Revised Groundwater Cleanup Criteria

Contaminants Detected	U.S. EPA ROD Clean up Goal (ppb)	MDEQ Part 201 Residential Drinking Water Criteria (ppb)[1]	MDEQ Part 201 Residential Health-Based Drinking Water Value (ppb)[3]	ROD Revised Clean-up Criteria (ppb)[4]	Maximum Detected Concentration (2009–2014)	Monitoring Well with Maximum Detected Concentration
Benzene	5	5 (5)	5	5	2.6 (2009)	RL-8I
sec-butyl Benzene	NI	80	80	NE	3.4 (2013)	WMW-3R
Carbon Disulfide	NI	800	800	NE	1.0 (2014)	C-60
Chloroform	2	80 (5)	100	100	4.9 (2010)	RL-8`S
Chloroethane	NI	430	430	NE	14 (2013)	RL-7D
1,2-Dichlorobenzene	NI	600 (5)	600	NE	1.6 (2013)	WMW-1R
Ethylbenzene	680	74 (2)	700 (3)	700	14 (2009)	TW4-20
Isopropyl Benzene	NI	800	800	NE	4.1 (2013)	WMW-1R
n-Propyl Benzene	NI	80	80	NE	6.9 (2013)	WMW-1R
1,2,4-Trimethylbenzene	NI	63 (2)	1,000 (3)	NE	76 (2013)	WMW-3R
l,3,5-Trimethylbenzene	NI	72 (2)	1,000 (3)	NE	33 (2013)	WMW-3R
Diethyl Ether	43	10 (2)	3,700 (3)	3,700	200 (2010)	RL-1
1,1-Dichloroethane	NI	880	880	NE	130 (2010)	RL-7D
1,2-Dichloroethane	5	5 (5)	5	5	1,100 (2009)	WMW-15
1,1,1-Trichloroethane	200	200 (5)	200	200	860 (2011)	WMW-16
1,1,2-Trichloroethane	NI	5 (5)	5	NE	ND	--
1,1-Dichloroethylene	7	7 (5)	7	7	28 (2014)	TTOS-7
cis-1,2-Dichloroethene	NI	70 (5)	70	70	80 (2014)	C-60
trans-1,2-Dichloroethylene	700	100 (5)	100	100	2.5 (2014)	TTOS-7
Hexachloroethane	NI	7.3	7.3	NE	ND	--
Dichlorodifluoromethane	NI	1,700	1,700	NE	ND	--
2-Butanone(MEK)	NI	13,000	7.3	NE	25 (2010)	TW4-20
2-Propanone (Acetone)	NI	730	1,700	NE	22 (2010)	TW4-20
Tetrachloroethylene	0.88	5 (5)	5	5	87 (2009)	WMW-7A
Trichloroethylene	5	5 (5)	5	5	230 (2013)	WMW-16
Trichlorofluoromethane	32,000	2,600	2,600	2,600	230 (2014)	TTOS-7
Methylene Chloride	NI	5 (5)	5	5	14 (2011)	RL-8D
4-Methyl-2-Pentanone (MIBK)	NI	1,800	1,800	NE	ND	--
Naphthalene	NI	520	520	520	120 (2013)	WMW-3R
2-Methylnapthalene	NI	260	260	260	240 (2013)	WMW-3R
Tetrahydrofuran	NI	95	95	NE	7.6 (2009)	WMW-14R
Toluene	2,000	790 (2)	1,000 (3)	1,000	47 (2013)	WMW-1R
p-Isopropyl Toluene	NI	NL	NL	NI/NL	62 (2013)	TW4-20
Vinyl Chloride	NI	2 (5)	2	2	11 (2012)	WMW-15
Xylene (total)	440	280 (2)	10,000 (3)	10,000	212 (2013)	TW4-20

1 - MDEQ Administrative Rules for Part 201 Residential and Non-Residential Generic Cleanup Criteria, updated December 30, 2013.
2 - Criterion is the aesthetic drinking water value, as required by Section 20120a (5) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA).
3 - Criteria listed are residential health-based drinking water values.
4 - Revised clean-up criteria include updated health-based criteria for all constituents identified in the Record of Decision (ROD), and criteria for all constituents not included in the ROD that exceeded health-based drinking water values during February 2002 through July 2003 sampling.
5 - Criterion is the state of Michigan drinking water standard established pursuant to Section 5 of 1976 PA 399, MCL 325.1005.
NE = Compound not included in original ROD and does not exceed health-based criteria, based on recent sampling.
NI = Not included in original ROD NL=Not listed in MDEQ Part 201 Criteria.

Table 9

Preliminary Screening for Reductive Dechlorination
U.S. Aviex Site

Analyte	Concentration	Assigned Value	86-2A (57-60 ft) Downgradient (In plume)				86-7 (178-182 ft) Sidegradient			A-25 (26-29 ft) Upgradient				A-40 (40-43 ft) Upgradient				A-150 (150-153 ft) Upgradient		
			5/22/2003	4/30/2012	10/4/2012	Points Awarded	4/30/2012	10/2/2012	Points Awarded	5/22/2003	5/1/2012	10/3/2012	Points Awarded	5/22/2003	5/1/2012	10/3/2012	Points Awarded	5/1/2012	10/4/2012	Points Awarded
Dissolved Oxygen (mg/L)	<0.5 mg/L >5 mg/L	3 -3	0.24	1.41	1.31	0	NA	5.33	-3	7.75	NM	6.49	-3	7.15	2.76	6.61	0	0.36	1.96	0
Nitrate + Nitrite (mg/L)	<1 mg/L	2	1.72	ND	0.06	2	ND	0.01	2	1.69	14	16	0	1.77	12 D	ND	0	ND	0.04	2
Iron (Dissolved) (mg/L)	>1 mg/L	2	2,600	ND	ND	2	490	140	2	34	ND	ND	0	780	360	610	3	440	98	2
Sulfate (mg/L)	<20 mg/L	3	18	3.9	30	3	30	24	0	12	29	37	0	22	33	3.6	1	33	35	0
Sulfide (mg/L)	>1 mg/L	2	ND	ND	0.018 J	0	0.25	0.22	0	ND	ND	ND	0	ND	0.066	0.026	0	0.099	0.3	0
Methane (mg/L)	<0.5 mg/L >0.5 mg/L	0 3	ND	0.049	ND	0	0.011	0.085	0	ND	ND	ND	0	ND	ND	0.011	0	0.18	0.13	0
ORP (mV)	<50 mV <-100 mV	1 2	-47.0	-176.7	-186.6	2	NM	-139.2	2	303	80	-65.6	1	185	-98.6	-78.1	1	-166.7	-122.5	2
pH	5 < pH < 9 5 > pH > 9	0 -2	7.61	9.24	NA	0	7.95	7.97	0	7.79	6.81	8.86	0	7.44	6.54	8.50	0	7.77	10.98	-2
TOC (mg/L)	>20 mg/L	2	1.2	3	3	0	0.9	0.9	0	1.6	1.4	1.3	0	1.1	1.4	0.9	0	2.2	1.5	0
Temperature (°C)	>20 °C	1	11.69	12.83	13.92	0	11.67	11.87	0	11.83	NM	13.21	0	12.24	11.31	15.51	0	13.73	14.52	0
Carbon Dioxide (mg/L)	>2x background	1	26	ND	20 *	0	4.3 *	6.4 *	0	18	9.6 *	14 *	0	15	56 *	43 *	0	6.1 *	ND	0
Alkalinity (mg/L)	>2x background	1	270	26	260	0	180	120	0	260	270	270	0	220	330	120	0	170	100	0
Chloride (mg/L)	>2x background	2	28	6.1	3.6	0	11	12	0	38	53	44	0	70	330 D	150	2	74	75	0
BTEX (µg/L)	>0.1 mg/L	2	ND	ND	ND	0	ND	ND	0	ND	ND	ND	0	ND	ND	ND	0	ND	ND	0
PCE (released) (µg/L)	Material Released	0	2	ND	6.8	0	ND	ND	0	ND	ND	ND	0	ND	ND	ND	0	ND	ND	0
TCE (released) (µg/L)	Material Released Daughter Product	0 2	43	ND	2.5	0	ND	ND	0	ND	ND	ND	0	ND	ND	ND	0	ND	ND	0
cis-DCE (none released) (µg/L)	Material Released Daughter Product	0 2	14	ND	1.2	2	ND	ND	0	ND	ND	ND	0	ND	ND	ND	0	ND	ND	0
VC (none released) (µg/L)	Material Released Daughter Product	0 2	ND	ND	ND	0	ND	ND	0	ND	ND	ND	0	ND	ND	ND	0	ND	ND	0
1,1,1-TCA (released) (µg/L)	Material Released	0	350	ND	54	0	ND	ND	0	ND	ND	ND	0	ND	ND	ND	0	ND	ND	0
1,1-DCA (none released) (µg/L)	Daughter Product	2	9.4	ND	11	2	ND	ND	0	ND	ND	ND	0	ND	ND	ND	0	ND	ND	0
Chloroethane (none released) (µg/L)	Daughter Product	2	ND	ND	ND	0	ND	ND	0	ND	ND	ND	0	ND	ND	ND	0	ND	ND	0
Ethene/Ethane (mg/L)	>0.01 mg/L <0.1 mg/L	2 3	ND ND	ND ND	ND ND	0	ND ND	ND ND	0	ND ND	ND ND	ND ND	0	ND ND	ND ND	ND ND	0	ND ND	ND ND	0
			Total Points Awarded			13	Total Points Awarded		3	Total Points Awarded			-2	Total Points Awarded			7	Total Points Awarded		4

Notes:

-Points awarded based on Table 2.3, Analytical Parameters and Weighting for Preliminary Screening for Anaerobic Biodegradation Processes, *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* , U.S. EPA, September 1998.

* = The referenced method requires analysis occur immediately after sample collection. Because analysis was not performed in the field, the reported result must be considered estimated.

BTEX = Benzene, Toluene, Ethylbenzene, and Total Xylenes
°C = degrees Celsius
cis-DCE = cis-dichloroethene
1,1-DCA = 1,1-Dichloroethane
ft = foot/feet
J = value is estimated
µg/L = micrograms per liter
mg/L = milligrams per liter
mV = millivolt
NA = Not analyzed; not applicable
ND = Not detected above the laboratory detection limit
NM = Not measured
ORP = Oxidation-reduction potential
PCE = Tetrachloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene
TOC = Total organic carbon
VC = Vinyl chloride
x = multiply

Table 3
PRELIMINARY SCREENING FOR REDUCTIVE DECHLORINATION
U.S. Aviex Site
Niles, Michigan

Analyte	Concentration	Assigned Value	E-40 (40-43 ft) Downgradient (in plume)			E-60 (60-63 ft) Downgradient			NW (TD = 39.6) Downgradient (in plume)			RL-1 (138-143 ft) Downgradient (in plume)			RL-2 (165-170 ft) Downgradient (in plume)		
			5/1/2012	10/3/2012	Points Awarded	5/1/2012	10/3/2012	Points Awarded	5/1/2012	10/2/2012	Points Awarded	5/1/2012	10/4/2012	Points Awarded	5/1/2012	10/3/2012	Points Awarded
Dissolved Oxygen (mg/L)	<0.5 mg/L >5 mg/L	3 -3	NM	0.59	0	0.59	0.41	3	0.94	0.33	3	NA	2.75	0	NA	NM	0
Nitrate + Nitrite (mg/L)	<1 mg/L	2	ND	0.49	2	ND	0.02	2	ND	0.02	2	0.45	0.68	2	3.4	NM	0
Iron (Dissolved) (mg/L)	>1 mg/L	2	5,300	4,900	2	10,000	10,000	2	300	380	2	ND	ND	2	ND	NM	2
Sulfate (mg/L)	<20 mg/L	3	32	22	0	43	20	0	26	25	0	51	46	0	23	NM	0
Sulfide (mg/L)	>1 mg/L	2	0.063	0.035	0	0.059	0.11	0	0.092	ND	0	0.39	0.17	0	0.19	NM	0
Methane (mg/L)	<0.5 mg/L >0.5 mg/L	0 3	0.084	0.063	0	0.15	1.4	0	0.012	0.005	0	ND	ND	0	0.006	NM	0
ORP (mV)	<50 mV <-100 mV	1 2	-112.7	-132.1	2	-113.9	-155.5	2	-84.8	-16.7	2	NM	-102.9	2	NM	NM	0
pH	5 < pH < 9 5 > pH > 9	0 -2	6.66	8.26	0	7.30	7.99	0	7.01	6.78	0	7.60	8.30	0	7.98	NM	0
TOC (mg/L)	>20 mg/L	2	0.9	1	0	2.9	3.5	0	0.5	0.5	0	0.5	0.5	0	0.5	NM	0
Temperature (°C)	>20 °C	1	NM	12.71	0	11.88	13.01	0	13.71	12.25	0	11.86	12.39	0	10.82	NM	0
Carbon Dioxide (mg/L)	>2x background	1	46 *	40 *	0	40 *	7 *	0	36 *	32 *	0	18 *	16 *	0	10 *	NM	0
Alkalinity (mg/L)	>2x background	1	370	390	0	310	330	0	350	360	0	270	290	0	220	NM	0
Chloride (mg/L)	>2x background	2	2.2	1.3	0	41	24	0	16	9.2	0	31	31	0	3.1	NM	0
BTEX (µg/L)	>0.1 mg/L	2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	NM	0
PCE (released) (µg/L)	Material Released	0	2	1.3	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	NM	0
TCE (released) (µg/L)	Material Released Daughter Product	0 2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	NM	0
cis-DCE (none released) (µg/L)	Material Released Daughter Product	0 2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	NM	0
VC (none released) (µg/L)	Material Released Daughter Product	0 2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	NM	0
1,1,1-TCA (released) (µg/L)	Material Released	0	ND	ND	0	ND	ND	0	ND	ND	0	3.5	3	0	3.2	NM	0
1,1-DCA (none released) (µg/L)	Daughter Product	2	ND	ND	0	1	ND	2	ND	ND	0	77	69	0	21	NM	2
Chloroethane (none released) (µg/L)	Daughter Product	2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	NM	0
Ethene/Ethane (mg/L)	>0.01 mg/L <0.1 mg/L	2 3	ND ND	ND ND	0	ND ND	ND ND	0	ND ND	ND ND	0	ND ND	ND ND	0	ND ND	NM	0
			Total Points Awarded		6	Total Points Awarded		11	Total Points Awarded		9	Total Points Awarded		6	Total Points Awarded		4

Notes:

-Points awarded based on Table 2.3, Analytical Parameters and Weighting for Preliminary Screening for Anaerobic Biodegradation Processes, *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* , U.S. EPA, September 1998.

* = The referenced method requires analysis occur immediately after sample collection. Because analysis was not performed in the field, the reported result must be considered estimated.

BTEX = Benzene, Toluene, Ethylbenzene, and Total Xylenes
°C = degrees Celsius
cis-DCE = cis-dichloroethene
1,1-DCA = 1,1-Dichloroethane
ft = foot/feet
J = value is estimated
µg/L = micrograms per liter
mg/L = milligrams per liter
mV = millivolt
NA = Not analyzed; not applicable
ND = Not detected above the laboratory detection limit
NM = Not measured
ORP = Oxidation-reduction potential
PCE = Tetrachloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene
TOC = Total organic carbon
VC = Vinyl chloride
x = multiply

Table 3
PRELIMINARY SCREENING FOR REDUCTIVE DECHLORINATION
U.S. Aviex Site
Niles, Michigan

Analyte	Concentration	Assigned Value	RL-4 (141-146 ft) Downgradient (in plume)			RL-5 (19.5-24.5 ft) Downgradient (in plume)			RL-7S (54.5-56.5 ft) Downgradient (in plume)			RL-7I (78.5-81 ft) Downgradient (in plume)			RL-7D (98.5-101 ft) Downgradient (in plume)		
			5/1/2012	10/3/2012	Points Awarded	5/1/2012	10/2/2012	Points Awarded	4/30/2012	10/3/2012	Points Awarded	4/30/2012	10/3/2012	Points Awarded	4/30/2012	10/3/2012	Points Awarded
Dissolved Oxygen (mg/L)	<0.5 mg/L >5 mg/L	3 -3	NA	2.1	0	6.60	4.65	0	0.21	6.15	1.5	0.03	4.16	1.5	0.01	2.31	1.5
Nitrate + Nitrite (mg/L)	<1 mg/L	2	ND	ND	2	0.13	0.05	2	9	9	0	3.6	3.6	0	ND	ND	2
Iron (Dissolved) (mg/L)	>1 mg/L	2	380	100	2	55	ND	0	ND	ND	3	ND	ND	0	1,600	1,200	3
Sulfate (mg/L)	<20 mg/L	3	51	23	0	34	50	0	32	32	0	48	48	0	53	53	0
Sulfide (mg/L)	>1 mg/L	2	0.68	9	2	ND	ND	0	ND	ND	0	0.029	ND	ND	ND	ND	0
Methane (mg/L)	<0.5 mg/L >0.5 mg/L	0 3	0.012	0.35	0	0.008	ND	0	ND	ND	0	ND	ND	0	0.008	0.008	0
ORP (mV)	<50 mV <-100 mV	1 2	NM	-94.5	1	-6.90	59.6	1	NA	40.3	1	NA	-155.9	2	NA	-169.5	2
pH	5 < pH < 9 5 > pH > 9	0 -2	7.71	9.42	-2	7.31	7.11	0	7.50	6.99	0	7.53	NA	0	7.08	NA	0
TOC (mg/L)	>20 mg/L	2	0.5	2.2	0	ND	0.5	0	0.5	0.5	0	0.6	0.6	0	1.3	1.3	0
Temperature (°C)	>20 °C	1	11.41	12.82	0	12.10	13.29	0	12.77	12.74	0	12.50	13.53	0	12.67	13.57	0
Carbon Dioxide (mg/L)	>2x background	1	14 *	4.5 *	0	10 *	15 *	0	30 *	26 *	0	21 *	20 *	0	18 *	16 *	0
Alkalinity (mg/L)	>2x background	1	240	190	0	230	280	0	300	300	0	270	270	0	220	220	0
Chloride (mg/L)	>2x background	2	32	31	0	3.9	5.9	0	18	18	0	27	27	0	43	43	0
BTEX (µg/L)	>0.1 mg/L	2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
PCE (released) (µg/L)	Material Released	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
TCE (released) (µg/L)	Material Released Daughter Product	0 2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
cis-DCE (none released) (µg/L)	Material Released Daughter Product	0 2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
VC (none released) (µg/L)	Material Released Daughter Product	0 2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
1,1,1-TCA (released) (µg/L)	Material Released	0	ND	ND	0	ND	ND	0	ND	ND	0	37	37	0	ND	ND	0
1,1-DCA (none released) (µg/L)	Daughter Product	2	11	17	2	ND	ND	0	ND	ND	0	23	23.0	2	85	85.0	2
Chloroethane (none released) (µg/L)	Daughter Product	2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	12	ND	2
Ethene/Ethane (mg/L)	>0.01 mg/L <0.1 mg/L	2 3	ND ND	ND ND	0	ND ND	ND ND	0	ND ND	ND ND	0	ND ND	ND ND	0	ND ND	ND ND	0
			Total Points Awarded		7	Total Points Awarded		3	Total Points Awarded		5.5	Total Points Awarded		5.5	Total Points Awarded		12.5

Notes:

-Points awarded based on Table 2.3, Analytical Parameters and Weighting for Preliminary Screening for Anaerobic Biodegradation Processes, *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* , U.S. EPA, September 1998.

* = The referenced method requires analysis occur immediately after sample collection. Because analysis was not performed in the field, the reported result must be considered estimated.

BTEX = Benzene, Toluene, Ethylbenzene, and Total Xylenes
°C = degrees Celsius
cis-DCE = cis-dichloroethene
1,1-DCA = 1,1-Dichloroethane
ft = foot/feet
J = value is estimated
µg/L = micrograms per liter
mg/L = milligrams per liter
mV = millivolt
NA = Not analyzed; not applicable
ND = Not detected above the laboratory detection limit
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ORP = Oxidation-reduction potential
PCE = Tetrachloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene
TOC = Total organic carbon
VC = Vinyl chloride
x = multiply

Table 3
PRELIMINARY SCREENING FOR REDUCTIVE DECHLORINATION
U.S. Aviex Site
Niles, Michigan

Analyte	Concentration	Assigned Value	RL-8S (55.5-58 ft) Downgradient (in plume)			RL-8I (75.5-78) Downgradient (in plume)			RL-8D (101.5-104 ft) Downgradient (in plume)			RL-9S (42.5-45 ft) Sidegradient			RL-9I (68.5-71 ft) Sidegradient		
			4/30/2012	10/3/2012	Points Awarded	4/30/2012	10/3/2012	Points Awarded	4/30/2012	10/4/2012	Points Awarded	4/30/2012	10/2/2012	Points Awarded	4/30/2012	10/2/2012	Points Awarded
Dissolved Oxygen (mg/L)	<0.5 mg/L >5 mg/L	3 -3	NA	5.48	-3	NA	4.97	0	NA	1.08	0	NA	7.94	-3	NA	6.30	-3
Nitrate + Nitrite (mg/L)	<1 mg/L	2	3	3.6	0	4.5	3.1	0	4.4	0.06	2	2.5	3.6	0	7.1	5.8	0
Iron (Dissolved) (mg/L)	>1 mg/L	2	ND	ND	2	ND	ND	2	ND	ND	2	ND	ND	2	ND	ND	2
Sulfate (mg/L)	<20 mg/L	3	30	23	0	33	24	0	47	50	0	38	28	0	32	35	0
Sulfide (mg/L)	>1 mg/L	2	ND	ND	0	0.014 J	ND	0	ND	ND	0	0.0074 J	ND	0	ND	ND	0
Methane (mg/L)	<0.5 mg/L >0.5 mg/L	0 3	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
ORP (mV)	<50 mV <-100 mV	1 2	NM	-124.5	2	NA	-14.5	1	NM	-124.6	2	NM	31.8	1	NM	11.1	1
pH	5 < pH < 9 5 > pH > 9	0 -2	7.10	NA	0	NA	8.40	0	7.66	9.28	0	6.91	6.97	0	6.74	7.13	0
TOC (mg/L)	>20 mg/L	2	0.4	0.5	0	0.5	ND	0	0.6	0.6	0	0.7	0.7	0	0.5	0.7	0
Temperature (°C)	>20 °C	1	13.20	13.32	0	NA	13.11	0	12.39	13.39	0	13.63	12.48	0	13.08	14.13	0
Carbon Dioxide (mg/L)	>2x background	1	22 *	20 *	0	23 *	22 *	0	20 *	25 *	0	26 *	27 *	0	26 *	25 *	0
Alkalinity (mg/L)	>2x background	1	290	370	0	330	340	0	340	340	0	380	350	0	310	310	0
Chloride (mg/L)	>2x background	2	31	29	0	49	44	0	68	39	0	15	29	0	26	18	0
BTEX (µg/L)	>0.1 mg/L	2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
PCE (released) (µg/L)	Material Released	0	ND	ND	0	1	1	0	ND	ND	0	ND	ND	0	ND	ND	0
TCE (released) (µg/L)	Material Released Daughter Product	0 2	ND	ND	0	5.4	3.6	0	ND	ND	0	ND	ND	0	ND	ND	0
cis-DCE (none released) (µg/L)	Material Released Daughter Product	0 2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
VC (none released) (µg/L)	Material Released Daughter Product	0 2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
1,1,1-TCA (released) (µg/L)	Material Released	0	ND	ND	0	ND	ND	0	22	17	0	ND	ND	0	ND	ND	0
1,1-DCA (none released) (µg/L)	Daughter Product	2	ND	ND	0	ND	ND	0	9.5	7.3	2	ND	ND	0	ND	ND	0
Chloroethane (none released) (µg/L)	Daughter Product	2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
Ethene/Ethane (mg/L)	>0.01 mg/L <0.1 mg/L	2 3	ND ND	ND ND	0	ND ND	ND ND	0	ND ND	ND ND	0	ND ND	ND ND	0	ND ND	ND ND	0
			Total Points Awarded		1	Total Points Awarded		3	Total Points Awarded		8	Total Points Awarded		0	Total Points Awarded		0

Notes:

-Points awarded based on Table 2.3, Analytical Parameters and Weighting for Preliminary Screening for Anaerobic Biodegradation Processes, *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* , U.S. EPA, September 1998.

* = The referenced method requires analysis occur immediately after sample collection. Because analysis was not performed in the field, the reported result must be considered estimated.

BTEX = Benzene, Toluene, Ethylbenzene, and Total Xylenes
°C = degrees Celsius
cis-DCE = cis-dichloroethene
1,1-DCA = 1,1-Dichloroethane
ft = foot/feet
J = value is estimated
µg/L = micrograms per liter
mg/L = milligrams per liter
mV = millivolt
NA = Not analyzed; not applicable
ND = Not detected above the laboratory detection limit
NM = Not measured
ORP = Oxidation-reduction potential
PCE = Tetrachloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene
TOC = Total organic carbon
VC = Vinyl chloride
x = multiply

Table 3
PRELIMINARY SCREENING FOR REDUCTIVE DECHLORINATION
U.S. Aviex Site
Niles, Michigan

Analyte	Concentration	Assigned Value	RL-9D (89.5-92 ft) Sidegradient			WMW-4A (19-24 ft) Source Area				WMW-4B (42-44 ft) Source Area				WMW-5 (41-43) Source Area			WMW-9 (145-150 ft) Sidegradient		
			4/30/2012	10/3/2012	Points Awarded	5/22/2003	5/1/2012	10/3/2012	Points Awarded	5/22/2003	5/1/2012	10/3/2012	Points Awarded	5/1/2012	10/4/2012	Points Awarded	4/30/2012	10/2/2012	Points Awarded
Dissolved Oxygen (mg/L)	<0.5 mg/L >5 mg/L	3 -3	0.03	3.83	1.5	5.72	8.20	4.40	0	7.01	0.50	2.01	0	0.51	0.40	3	NA	9.68	-3
Nitrate + Nitrite (mg/L)	<1 mg/L	2	ND	0.03	2	0.79	0.98	0.54	2	1.19	2.6	2.8	0	2.2	2.6	0	ND	ND	2
Iron (Dissolved) (mg/L)	>1 mg/L	2	ND	ND	3	520	ND	ND	0	5,100	ND	ND	0	ND	ND	2	510	ND	2
Sulfate (mg/L)	<20 mg/L	3	62	59	0	ND	45	27	0	12	27	16	0	23	33	0	47	41	0
Sulfide (mg/L)	>1 mg/L	2	ND	0.0088 J	0	ND	ND	ND	0	ND	ND	0.0085 J	0	ND	ND	0	0.19	8.9	2
Methane (mg/L)	<0.5 mg/L >0.5 mg/L	0 3	ND	ND	0	ND	ND	ND	0	ND	0.69	0.2	0	0.16	0.018	0	0.036	0.064	0
ORP (mV)	<50 mV <-100 mV	1 2	NA	9.2	1	-92	73	-72.3	1	70	56.6	-67.6	1	111.1	13.2	0	NM	-90.4	1
pH	5 < pH < 9 5 > pH > 9	0 -2	7.5	7.13	0	7.32	7.02	9.95	-2	7.39	7.25	8.79	0	7.00	7.22	0	8.21	8.13	0
TOC (mg/L)	>20 mg/L	2	0.8	0.9	0	1.6	2.3	1.6	0	1.5	1.8	1.5	0	1.6	1.7	0	0.7	0.8	0
Temperature (°C)	>20 °C	1	13.3	14.90	0	11.37	11.32	13.20	0	12.69	17.62	12.52	0	11.65	13.13	0	11.80	11.69	0
Carbon Dioxide (mg/L)	>2x background	1	25 *	21 *	0	39	19 *	16 *	0	35	18 *	18 *	0	24 *	27 *	0	8.7 *	8.5 *	0
Alkalinity (mg/L)	>2x background	1	310	200	0	300	230	220	0	280	300	300	0	300	360	0	250	160	0
Chloride (mg/L)	>2x background	2	36	38	0	2	3	3	0	16	28	35	0	2.8	3	0	42	36	0
BTEX (µg/L)	>0.1 mg/L	2	ND	ND	0	ND	ND	ND	0	ND	ND	ND	0	ND	ND	0	ND	ND	0
PCE (released) (µg/L)	Material Released	0	ND	ND	0	13	1.2	1.0	0	5.4	2.6	2.0	0	5.9	4.4	0	ND	ND	0
TCE (released) (µg/L)	Material Released Daughter Product	0 2	ND	ND	0	14	ND	ND	0	2.3	1.3	1.2	0	1.3	1.4	0	ND	ND	0
cis-DCE (none released) (µg/L)	Material Released Daughter Product	0 2	ND	ND	0	3.5	ND	ND	0	1.3	ND	ND	0	1.5	ND	2	ND	ND	0
VC (none released) (µg/L)	Material Released Daughter Product	0 2	ND	ND	0	ND	ND	ND	0	ND	ND	ND	0	ND	ND	0	ND	ND	0
1,1,1-TCA (released) (µg/L)	Material Released	0	ND	ND	0	860	57	49	0	150	11	15	0	29	20	0	ND	ND	0
1,1-DCA (none released) (µg/L)	Daughter Product	2	ND	ND	0	28	ND	1.0	2	ND	3.6	1.7	2	4.3	4.1	2	ND	ND	0
Chloroethane (none released) (µg/L)	Daughter Product	2	ND	ND	0	ND	ND	ND	0	ND	ND	ND	0	ND	ND	0	ND	ND	0
Ethene/Ethane (mg/L)	>0.01 mg/L <0.1 mg/L	2 3	ND ND	ND ND	0	1.8 ND	ND ND	ND ND -	0	ND ND	ND ND	ND ND	0	ND ND	ND ND	0	ND ND	ND ND	0
			Total Points Awarded		7.5	Total Points Awarded			3	Total Points Awarded			3	Total Points Awarded		9	Total Points Awarded		4

Notes:

-Points awarded based on Table 2.3, Analytical Parameters and Weighting for Preliminary Screening for Anaerobic Biodegradation Processes, *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* , U.S. EPA, September 1998.

* = The referenced method requires analysis occur immediately after sample collection. Because analysis was not performed in the field, the reported result must be considered estimated.

BTEX = Benzene, Toluene, Ethylbenzene, and Total Xylenes
°C = degrees Celsius
cis-DCE = cis-dichloroethene
1,1-DCA = 1,1-Dichloroethane
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J = value is estimated
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NA = Not analyzed; not applicable
ND = Not detected above the laboratory detection limit
NM = Not measured
ORP = Oxidation-reduction potential
PCE = Tetrachloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
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TOC = Total organic carbon
VC = Vinyl chloride
x = multiply

Table 3
PRELIMINARY SCREENING FOR REDUCTIVE DECHLORINATION
U.S. Aviex Site
Niles, Michigan

Analyte	Concentration	Assigned Value	WMW-10S (110-115 ft) Downgradient (in plume)			WMW-10D (155-160) Downgradient (in plume)			WMW-11S (115-120 ft) Sidegradient			WMW-12S (78-83 ft) Sidegradient			WMW-12D (140-145 ft) Sidegradient			WMW-11D (155-160 ft) Sidegradient		
			4/30/2012	10/2/2012	Points Awarded	4/30/2012	10/2/2012	Points Awarded	4/30/2012	10/2/2012	Points Awarded	4/30/2012	10/2/2012	Points Awarded	4/30/2012	10/2/2012	Points Awarded	4/30/2012	10/2/2012	Points Awarded
Dissolved Oxygen (mg/L)	<0.5 mg/L >5 mg/L	3 -3	NA	2.49	0	NA	2.70	0	NA	4.66	0	NA	2.36	0	NA	2.36	0	NA	2.78	0
Nitrate + Nitrite (mg/L)	<1 mg/L	2	ND	ND	2	ND	ND	2	ND	ND	2	4.4	3.9	0	4.4	3.9	0	ND	0.02	2
Iron (Dissolved) (mg/L)	>1 mg/L	2	160	240	2	140	280	2	620	640	2	40	ND	0	ND	ND	0	640	520	2
Sulfate (mg/L)	<20 mg/L	3	49	44	0	32	38	0	580	24	0	48	48	0	48	48	0	43	30	0
Sulfide (mg/L)	>1 mg/L	2	0.38	0.25	0	0.22	0.1	0	0.22	2.1	2	0.026	0.019 J	0	0.026	0.019 J	0	4.2	2.6	2
Methane (mg/L)	<0.5 mg/L >0.5 mg/L	0 3	0.027	0.037	0	1.1	0.041	3	0.042	0.01	0	0.013	0.032	0	0.013	0.032	0	0.021	0.016	0
ORP (mV)	<50 mV <-100 mV	1 2	NM	-196.1	2	NM	-166.7	2	NM	-132.7	2	NA	-73.0	1	NA	-73.0	1	NM	-170.8	2
pH	5 < pH < 9 5 > pH > 9	0 -2	8.13	10.01	-2	9.17	9.15	-2	8.15	9.70	-2	NA	8.40	0	NA	8.40	0	8.02	9.93	-2
TOC (mg/L)	>20 mg/L	2	0.6	0.7	0	2.4	0.9	0	0.7	0.8	0	ND	0.5	0	ND	0.5	0	1.2	0.8	0
Temperature (°C)	>20 °C	1	10.94	11.70	0	11.26	11.68	0	10.73	10.74	0	NA	12.61	0	NA	12.61	0	10.84	11.29	0
Carbon Dioxide (mg/L)	>2x background	1	6.9 *	7.6 *	0	ND	4.7 *	0	6.5 *	7.4 *	0	13 *	12 *	0	13 *	12 *	0	6.9 *	5.2 *	0
Alkalinity (mg/L)	>2x background	1	220	210	0	160	190	0	ND	250	0	260	170	0	260	170	0	190	200	0
Chloride (mg/L)	>2x background	2	12	13	0	12	14	0	5.3	5.7	0	51	47	0	51	47	0	8.1	8.5	0
BTEX (µg/L)	>0.1 mg/L	2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
PCE (released) (µg/L)	Material Released	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
TCE (released) (µg/L)	Material Released Daughter Product	0 2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
cis-DCE (none released) (µg/L)	Material Released Daughter Product	0 2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
VC (none released) (µg/L)	Material Released Daughter Product	0 2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
1,1,1-TCA (released) (µg/L)	Material Released	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
1,1-DCA (none released) (µg/L)	Daughter Product	2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
Chloroethane (none released) (µg/L)	Daughter Product	2	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0
Ethene/Ethane (mg/L)	>0.01 mg/L <0.1 mg/L	2 3	ND ND	ND ND	0	ND ND	ND ND	0	ND ND	ND ND	0	ND ND	ND ND	0	ND ND	ND ND	0	ND ND	ND ND	0
			Total Points Awarded		4	Total Points Awarded		7	Total Points Awarded		6	Total Points Awarded		1	Total Points Awarded		1	Total Points Awarded		6

Notes:

-Points awarded based on Table 2.3, Analytical Parameters and Weighting for Preliminary Screening for Anaerobic Biodegradation Processes, *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* , U.S. EPA, September 1998.

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PCE = TetraChloroethene
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TCE = Trichloroethene
TOC = Total organic carbon
VC = Vinyl chloride
x = multiply

Attachment 1

Liber 00873 Page 0187

STATE OF MICHIGAN
COUNTY OF CASS
Recorded

12-10-2003 11:01:29

Ann L. Simmons
REGISTER OF DEEDS

GRANT OF EASEMENT

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY

For consideration less than $100.00 and in consideration of the Department of Environmental Quality's performance of response activity and no other consideration, the GRANTOR,

State of Michigan
Department of Natural Resources
P.O. Box 30448
Lansing, Michigan 48909

does hereby grant, convey, and release to the GRANTEE,

State of Michigan
Department of Environmental Quality
P.O. Box 30426
Lansing, Michigan 48909-7926

an EASEMENT IN GROSS, the purpose being for the performance of necessary response activities at the U.S. Aviex Facility (Facility), for the property identified as follows:

Cass County, T07S, R16W, Section 29, NE1/4 of SW1/4
A parcel of land described as commencing 748 feet south of the center of Section 29; THENCE South 176 feet; THENCE West 495 feet; THENCE North 176 feet; THENCE East 495 feet to the point of beginning.

All of the Facility, which includes all of the property subject to this Grant of Easement (Easement) identified above, is a site of environmental contamination (a "facility" as defined by Part 201, Environmental Remediation, (Part 201), of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), MCL 324.20101, *et seq.*).

As used herein, the term "Grantor" means at any given time during the existence of this Easement the then current title holder of all or any portion of the property identified above. The term "Grantee," as used herein, means the Department of Environmental Quality (DEQ), its successors and assigns. The term "Grantee Parties," as used herein, means the Grantee and its agents, and employees.

This Easement provides for access to the property and for the implementation of response activities at the property by the Grantee Parties acting under authority set forth in Sections 20117(3)(e) and 20118 of the NREPA and Section 9604 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 USC Section 9604 *et seq.* The anticipated response activities include, but are not limited to, utilization of existing utilities located on the property; remedial investigation; installation, operation, inspection, maintenance, repair, and replacement of free product recovery systems and groundwater treatment facilities; the

23

evaluation and potential removal, treatment or exposure control related to abandoned hazardous substances, or to vapor, soil, surface water, or sediments contaminated by hazardous substances; and the placement of land-use restrictions necessary to protect the public health, safety, and welfare, and the environment.

Pursuant to this Easement, full right and authority is provided to the GRANTEE PARTIES to enter at all times upon said premises for the purpose of performing response activities, subject to the following conditions:

(1) Grantee accepts this Easement subject to all prior, valid and recorded easements, permits, licenses, leases, or other rights existing or pending at the time of the issuance of this Easement, which may have been granted on said land.

(2) Grantee Parties, to the fullest extent practicable, shall limit intrusive activities on said land to those areas of contamination subject to response activities pursuant to state law.

(3) In granting this Easement, Grantor accepts no liability for the actions of the Grantee Parties and accepts no liability for injury or mishap sustained or caused by the Grantee Parties unless attributable to Grantor's actions, negligence, or violation of the law.

(4) In granting this Easement, Grantor agrees not to interfere with, interrupt, change, or otherwise disturb any systems, equipment, or signs installed or utilized by Grantee Parties. Grantor also agrees not to use said land in a manner that increases the cost of response activities, or otherwise exacerbates the existing contamination located on the property. The term "exacerbation" as used in this Easement has the meaning as contained in Section 20101(1)(n) of the NREPA. The Grantor and any future owners subject to this Easement shall consult with the Grantee prior to performing any construction activities on the property, to ensure that this Easement and its purpose of supporting the effective implementation of the response activities by the Grantee Parties is not violated.

(5) This Easement and the rights and obligations herein shall continue in full force and effect until such time as the response activities deemed necessary at the Facility by the Grantee have been completed. The Grantee, for itself, its successors and assigns, agrees to release and quit claim all rights secured under this Easement to the then owner upon completion of Grantee's response activities and upon request of the owner of said land showing a *prima facie* title to same. Such determination to release the Easement is in the sole discretion of the Grantee. At any time after the execution of this Easement, the owner may request that some of the land subject to the Easement be released. The Grantee may grant such request to the extent it would not impede or impair the performance of response activities. Such determination to release this Easement or any portion of this Easement is in the sole discretion of the Grantee. Should the owner of all or a portion of the property covered by this Easement request a partial release and the Grantee agrees to such request, the owner shall prepare a Partial Release of Easement document for the signature and approval of the Grantee. The Partial Release of Easement shall be prepared for signature by the Chief of the Remediation and Redevelopment Division, the Grantee's representative, in a manner acceptable to the Grantee and to the Cass County Register of Deeds, and submitted to the attention of Project Manager, U.S. Aviex Facility at the address below with a request that the Grantee execute the document. Upon receipt of a signed Partial Release of Easement from the Grantee, the owner shall record the Partial Release of Easement with the Cass County Register of Deeds and provide the Grantee with a certified copy of the document as recorded.

(6) Pursuant to this Easement, Grantor agrees that in any lease entered into by the Grantor, concerning all or any portion of the property subject to this Easement, the Grantor will provide notice of this Easement to the lessee and shall assure that the lessee is bound to comply with this Easement by including its terms in the lease agreement.

Unless otherwise stated herein, all terms used in this document, which are defined in Part 3, Definitions, of the NREPA, MCL 324.301; Part 201 of the NREPA, MCL 324.201; or the Part 201 Administrative Rules (Part 201 Rules), 1990 AACS R 299.5101, *et seq.*, as amended by changes at 2002 Michigan Register 24 that

became effective on December 21, 2002, shall have the same meaning in this document as in Parts 3 and 201 of the NREPA and the Part 201 Rules.

Correspondence related to this Easement shall be made to the Grantee, Attention: Project Manager, U.S. Avlex Facility, Cass County, Superfund Section, Remediation and Redevelopment Division, Department of Environmental Quality, 525 West Allegan Street, 3rd Floor South, Lansing, Michigan 48933.

The Grantors may execute this Easement in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute the same instrument. The Easement shall be effective when signed by all Grantors.

In Witness Whereof, David A. Buick, Manager, Tax Reversion and Land Records, Office of Land and Facilities, has caused these presents to be signed in his name for the Department of Natural Resources.

Dated this 26th day of November, 2003.

Signed in the presence of:

Trish Simon - Trish Simon

Eugene Bazzo - Eugene Bazzo

Signed by: David A Buick

David A. Buick
Manager
Tax Reversion and Land Records
Office of Land and Facilities,
Department of Natural Resources

STATE OF MICHIGAN
COUNTY OF INGHAM

The foregoing instrument was acknowledged before me this 26th day of November, 2003,
by David A. Buick, Manager, TRLR, OLAF, DNR

Roxanne L. Harris

Roxanne L. Harris
Notary Public
Ingham County, Michigan
My Commission Expires: February 21, 2008

Prepared by: Matthew Williams, Project Manager
Superfund Section
Remediation and Redevelopment Division
Department of Environmental Quality
Constitution Hall, 3rd Floor South
525 West Allegan Street
Lansing, Michigan 48933

APPROVED AS TO FORM:

James L. Stropkai (P24588)
Assistant Attorney General
Environment, Natural Resources, and Agriculture Division
Department of Attorney General

11/14/03
Date

Liber 00873 Page 0183

STATE OF MICHIGAN
COUNTY OF CASS
Recorded

12-10-2003 11:00:49

Ann L. Simmons
REGISTER OF DEEDS

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DEPARTMENT OF ENVIRONMENTAL QUALITY

For consideration less than $100.00 and in consideration of the Department of Environmental Quality's performance of response activity and no other consideration, the GRANTOR,

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Lansing, Michigan 48909-7926

an EASEMENT IN GROSS, the purpose being for the performance of necessary response activities at the U.S. Aviex Facility (Facility), for the property identified as follows:

Cass County, T07S, R16W, Section 29, NE1/4 of SW1/4
A parcel of land described as commencing 924 feet south of the center of Section 29; THENCE South 232 feet; THENCE West 660.38 feet; THENCE North 232 feet; THENCE East 660.38 feet to the point of beginning.

All of the Facility, which includes all of the property subject to this Grant of Easement (Easement) identified above, is a site of environmental contamination (a "facility" as defined by Part 201, Environmental Remediation, (Part 201), of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), MCL 324.20101, *et seq.*).

As used herein, the term "Grantor" means at any given time during the existence of this Easement the then current title holder of all or any portion of the property identified above. The term "Grantee," as used herein, means the Department of Environmental Quality (DEQ), its successors and assigns. The term "Grantee Parties," as used herein, means the Grantee and its agents, and employees.

This Easement provides for access to the property and for the implementation of response activities at the property by the Grantee Parties acting under authority set forth in Sections 20117(3)(e) and 20118 of the NREPA and Section 9604 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 USC Section 9604 *et seq.* The anticipated response activities include, but are not limited to, utilization of existing utilities located on the property; remedial investigation; installation, operation, inspection, maintenance, repair, and replacement of free product recovery systems and groundwater treatment facilities; the evaluation and potential removal, treatment or exposure control related to abandoned hazardous substances, or to

vapor, soil, surface water, or sediments contaminated by hazardous substances; and the placement of land-use restrictions necessary to protect the public health, safety, and welfare, and the environment.

Pursuant to this Easement, full right and authority is provided to the GRANTEE PARTIES to enter at all times upon said premises for the purpose of performing response activities, subject to the following conditions:

(1) Grantee accepts this Easement subject to all prior, valid and recorded easements, permits, licenses, leases, or other rights existing or pending at the time of the issuance of this Easement, which may have been granted on said land.

(2) Grantee Parties, to the fullest extent practicable, shall limit intrusive activities on said land to those areas of contamination subject to response activities pursuant to state law.

(3) In granting this Easement, Grantor accepts no liability for the actions of the Grantee Parties and accepts no liability for injury or mishap sustained or caused by the Grantee Parties unless attributable to Grantor's actions, negligence, or violation of the law.

(4) In granting this Easement, Grantor agrees not to interfere with, interrupt, change, or otherwise disturb any systems, equipment, or signs installed or utilized by Grantee Parties. Grantor also agrees not to use said land in a manner that increases the cost of response activities, or otherwise exacerbates the existing contamination located on the property. The term "exacerbation" as used in this Easement has the meaning as contained in Section 20101(1)(n) of the NREPA. The Grantor and any future owners subject to this Easement shall consult with the Grantee prior to performing any construction activities on the property, to ensure that this Easement and its purpose of supporting the effective implementation of the response activities by the Grantee Parties is not violated.

(5) This Easement and the rights and obligations herein shall continue in full force and effect until such time as the response activities deemed necessary at the Facility by the Grantee have been completed. The Grantee, for itself, its successors and assigns, agrees to release and quit claim all rights secured under this Easement to the then owner upon completion of Grantee's response activities and upon request of the owner of said land showing a *prima facie* title to same. Such determination to release the Easement is in the sole discretion of the Grantee. At any time after the execution of this Easement, the owner may request that some of the land subject to the Easement be released. The Grantee may grant such request to the extent it would not impede or impair the performance of response activities. Such determination to release this Easement or any portion of this Easement is in the sole discretion of the Grantee. Should the owner of all or a portion of the property covered by this Easement request a partial release and the Grantee agrees to such request, the owner shall prepare a Partial Release of Easement document for the signature and approval of the Grantee. The Partial Release of Easement shall be prepared for signature by the Chief of the Remediation and Redevelopment Division, the Grantee's representative, in a manner acceptable to the Grantee and to the Cass County Register of Deeds, and submitted to the attention of Project Manager, U.S. Aviex Facility at the address below with a request that the Grantee execute the document. Upon receipt of a signed Partial Release of Easement from the Grantee, the owner shall record the Partial Release of Easement with the Cass County Register of Deeds and provide the Grantee with a certified copy of the document as recorded.

(6) Pursuant to this Easement, Grantor agrees that in any lease entered into by the Grantor, concerning all or any portion of the property subject to this Easement, the Grantor will provide notice of this Easement to the lessee and shall assure that the lessee is bound to comply with this Easement by including its terms in the lease agreement.

Unless otherwise stated herein, all terms used in this document, which are defined in Part 3, Definitions, of the NREPA, MCL 324.301; Part 201 of the NREPA, MCL 324.201; or the Part 201 Administrative Rules (Part 201 Rules), 1990 AACS R 299.5101, *et seq.*, as amended by changes at 2002 Michigan Register 24 that

became effective on December 21, 2002, shall have the same meaning in this document as in Parts 3 and 201 of the NREPA and the Part 201 Rules.

Correspondence related to this Easement shall be made to the Grantee, Attention: Project Manager, U.S. Aviex Facility, Cass County, Superfund Section, Remediation and Redevelopment Division, Department of Environmental Quality, 525 West Allegan Street, 3rd Floor South, Lansing, Michigan 48933.

The Grantors may execute this Easement in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute the same instrument. The Easement shall be effective when signed by all Grantors.

In Witness Whereof, David A. Buick, Manager, Tax Reversion and Land Records, Office of Land and Facilities, has caused these presents to be signed in his name for the Department of Natural Resources.

Dated this 26th day of November, 2003.

Signed in the presence of:

Trish Simon - Trish Simon

Eugene Borro Eva Rossi

Signed by:

David A. Buick
Manager
Tax Reversion and Land Records
Office of Land and Facilities,
Department of Natural Resources

STATE OF MICHIGAN
COUNTY OF INGHAM

The foregoing instrument was acknowledged before me this 26th day of November, 2003, by David A. Buick, as Manager, TRLR, OLAF, DNR.

Roxanne L. Harris
Notary Public
Ingham County, Michigan
My Commission Expires: February 21, 2008

Prepared by: Matthew Williams, Project Manager
Superfund Section
Remediation and Redevelopment Division
Department of Environmental Quality
Constitution Hall, 3rd Floor South
525 West Allegan Street
Lansing, Michigan 48933

APPROVED AS TO FORM:

James L. Stropkai (P24588)
Assistant Attorney General
Environment, Natural Resources, and Agriculture Division
Department of Attorney General

11/14/03
Date

Attachment 2

State of Michigan
LAND BANK FAST TRACK AUTHORITY

300 NORTH WASHINGTON SQUARE
LANSING, MICHIGAN 48913

Kim Homan, Esq.
Executive Director

September 18, 2012

Director
Superfund Division (SR-6J)
U.S. Environmental Protection Agency, Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604

RE: Notice of Intent to Transfer Interest in Property
(U.S. Aviex Superfund Site, Cass County, Michigan)

Dear Director,

This notice is being sent in regards to property referenced in the Declaration of Restrictive Covenant and Grant of Environmental Protection Easement (DRC), dated October 11, 2011 and recorded with the Cass County Register of Deeds, Liber 1038, Page 291.

MDEQ Site ID Number 14000017
MDEQ Reference Number RC-RD-201-11-020
U.S. EPA Site Number MID980794556
Property Tax ID Number 14-020-029-074-00

The transfer of interest will be in the form of a Quitclaim Deed that will include the language stated in the DRC as follows:

NOTICE: THE INTEREST CONVEYED HEREBY IS SUBJECT TO A DECLARATION OF RESTRICTIVE COVENANT AND ENVIRONMENTAL PROTECTION EASEMENT, DATED OCTOBER 11, 2011 AND RECORDED WITH THE CASS COUNTY REGISTER OF DEEDS, LIBER 1038, Page 291.

If there are any questions or concerns I can be contacted at (810) 931-8592.

Sincerely,

Jeff Huntington, Senior Property Analyst
Michigan Land Bank Fast Track Authority

Cc Office of Regional Counsel (C-14J) – U.S EPA
Chief, Remediation Division – MDEQ

Michigan Land Bank Fast Track Authority

Board of Directors:

Regina T. Bell
Carl English, Vice Chair
Michael A. Finney
Gary Heidel
Steven Hilfinger
Deborah Muchmore, Chair
Scott Woosley

State of Michigan
LAND BANK FAST TRACK AUTHORITY

300 NORTH WASHINGTON SQUARE
LANSING, MICHIGAN 48913

Kim Homan, Esq.
Executive Director

September 18, 2012

Director
Superfund Division (SR-6J)
U.S. Environmental Protection Agency, Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604

RE: Notice of Intent to Transfer Interest in Property
(U.S. Aviex Superfund Site, Cass County, Michigan)

Dear Director,

This notice is being sent in regards to property referenced in the Declaration of Restrictive Covenant and Grant of Environmental Protection Easement (DRC), dated October 11, 2011 and recorded with the Cass County Register of Deeds, Liber 1038, Page 276.

MDEQ Site ID Number 14000017
MDEQ Reference Number RC-RD-201-11-021
U.S. EPA Site Number MID980794556
Property Tax ID Number 14-020-029-063-00

The transfer of interest will be in the form of a Quitclaim Deed that will include the language stated in the DRC as follows:

NOTICE: THE INTEREST CONVEYED HEREBY IS SUBJECT TO A DECLARATION OF RESTRICTIVE COVENANT AND ENVIRONMENTAL PROTECTION EASEMENT, DATED OCTOBER 11, 2011 AND RECORDED WITH THE CASS COUNTY REGISTER OF DEEDS, LIBER 1038, Page 276.

If there are any questions or concerns I can be contacted at (810) 931-8592.

Sincerely,

Jeff Huntington, Senior Property Analyst
Michigan Land Bank Fast Track Authority

Cc Office of Regional Counsel (C-14J) – U.S EPA
Chief, Remediation Division – MDEQ

DECLARATION OF RESTRICTIVE COVENANT AND GRANT OF ENVIRONMENTAL PROTECTION EASEMENT

This transfer is exempt from County and State transfer taxes pursuant to MCI 207.505(a) and MCI 207.526(a), respectively.

U.S. Aviex Superfund Site, Cass County, Michigan
MDEQ Site 10 No. 14000017
U.S. EPA Site No. MID980794556

MDEQ Reference No. RC-RD-201-11-Q21

This Declaration of Restrictive Covenant and Grant of Environmental Protection Easement ("Restrictive Covenant and Easement") is made on ~~September~~ October 11, 2011 by the State of Michigan - Michigan land Bank, Fast Track Authority, the Grantor, whose address is P.O. Box 30448, lansing, Michigan, 48909 for the benefit of the Grantee, the Michigan Department of Environmental Quality ("MDEQ"), whose address is P.O. Box 30473, lansing, Michigan 48909-7926.

RECITALS

i. The Grantor is the title holder of the real property located in Cass County, Michigan and legally described in Exhibit 1 attached hereto ("Property"); Tax ID No. 14-020-029-063-00.

ii. The purpose of this Restrictive Covenant and Easement is to create restrictions that run with the land in the Grantor's real property rights; to protect the public health, safety, and welfare, and the environment; to prohibit.or restrict activities that could result in unacceptable exposure to environmental contamination present at the Property; and to grant access to the Grantee, the United States Environmental Protection Agency ("U.S. EPA") as a Third Party Beneficiary, and either agency's representatives to monitor and condUct Response Activities.

iii. A Record of Decision (ROD) has been issued by the U.S. EPA for the purpose of carrying out the Response Activities selected to address environmental contamination at the Site. The MDEQ concurred with the ROD in a letter dated September 7, 1988. The Response Activities summarized below are more fUlly described in the ROO and are being implemented by the MDEQ. The ROD also consists of an Explanation of Significant Difference (ESD) and a ROD Amendment issued by the U.S. EPA on September 23, 1993, and September 29, 2004, respectively that are being implemented by the MDEQ.

iv. The Property is associated with the U.S. Aviex Superfund Site (the "Site"), MDEQ Site 10 No. 14000017. Hazardous substances, including chlorinated hydrocarbons, such as 1,2, dichloroethane, 1,1,1 trichloroethane, trichloroethene and tetrachloroethene (PCE), and other volatile organic compounds (VOCs) such as toluene and diethyl ether, have been released and/or disposed of on the Property. The Site was placed on the National Priorities List ("NPI") on September 8, 1983, and is a facility as that term is defined in Section 101(9) of the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. Section 9601 *et seq.* ("CERCLA"); and Section 20101 (1)(r) of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, MCI 324.20101 *et seq.* ("NREPA").

v. At the time of recording this Restrictive Covenant and Easement, groundwater containing 1,2, dichloroethane, 1,1,1 trichloroethane, diethyl ether, toluene, tetrachloroethene, and trichloroethene remain present at the Property at levels exceeding federal maximum contaminant levels and state drinking water standards. The U.S. EPA and the MDEQ have detennined that the hazardous substances at the Property present a threat to human health through ingestion and contact with groundwater, direct contact with soils, inhalation of airborne contaminants from soil volatilization, and inhalation of volatiles from groundwater; and that the land use and resource use restrictions set forth below are required to prevent unacceptable exposures. Further, the Grantor acknowledges, and the MDEQ has detennined, that analysis of samples of groundwater underlying the Property has shown that hazardous substance concentrations in groundwater exceed the applicable aesthetic criteria under Part 201 for diethyl ether and toluene, due to odor characteristics.

vi. The restrictions contained in this Restrictive Covenant and Easement are based upon information available to the U.S. EPA and the MDEQ at the time of recording this Restrictive Covenant and Easement. Failure of the Response Activities to achieve and maintain the criteria, exposure controls, and requirements specified in the ROD; future changes in the environmental condition of the Property or changes in the applicable cleanup criteria; the discovery of environmental conditions at the Property that were not accounted for in the ROD, regardless of the date of the release of hazardous substances contributing to those environmental conditions; or the use of the Property in a manner inconsistent with the restrictions described herein, may result in this Restrictive Covenant and Easement not being protective of public health, safety, and welfare, and the environment. Infonnation pertaining to the environmental conditions at the Property and Response Activities undertaken at the Site is on file with the U.S. EPA and the MDEQ, Remediation Division.

vii. The MDEQ recommends that prospective purchasers or users of the Property undertake appropriate due diligence prior to acquiring or using this Property, and undertake appropriate actions to comply with the applicable requirements of Section 20107a of the NREPA.

SUMMARY OF RESPONSE ACTIVITIES

The Property is the location of a fonner non-lubricating automotive fluids manufacturing facility. Manufacturing was conducted at the facility from the early 1960s through 1978. Investigative activities conducted at the Site following a 1978 fire identified contaminated groundwater. Constituents identified in the groundwaterIncluded chlorinated VOCs, diethyl ether, and benzene, toluene, ethylbenzene, and xylenes.

Response activities at the Site have taken place from the early 1980s to the time of filing this Restrictive Covenant and Easement, and include the following: installation of a groundwater extraction system that was operated in various capacities from the 1980s through 2003, installation of a monitoring well network, connection of area residents to the municipal water supply, installation and operation of a ozone/air sparge system, monitored natural attenuation (MNA) of the contaminated groundwater plume and source area, and source area removal of contaminated soil.

The remedy that was selected in the 1988 ROD and then later modified in the 1993 ESD was to eliminate the principal threats to human health and the environment posed by the conditions at the Site by reducing the potential for human exposure to contaminants in the groundwater and by eliminating the threat to the groundwater through the treatment of on-site soil contamination. Monitoring data indicated that the selected groundwater extraction and treatment system successfully treated the contaminated groundwater plume to near maximum contaminant level (MCI) values.The low level of residual contamination rendered the pump and treat system extremely inefficient and costly to operate to remove additional residual contamination. Further, MDEQ studies identified contaminant source areas at the Property which were releasing low levels of contamination into the plume.

As a result the 2004 ROD Amendment modified the selected remedy for the Site. The selected treatment method was changed from a groundwater extraction and treatment system to MNA. The MNA was augmented with on-site in-situ treatment to address the contaminant source areas at the Property at or just below the groundwater/vadose zone interface.

The implementation of the response activities summarized above has resulted in the reduction of contaminant concentrations in the soil and groundwater beneath the Property. As a result, plume migration from the identified source areas at the Property has been diminished, minimizing unacceptable exposure to contaminated groundwater and contaminated soils to area receptors.

However, following the response activities, the Property described in Exhibit 1 may contain hazardous substances in soil and groundwater in excess of the concentrations developed as the unrestricted residential criteria under Section 20120a(1)(a) or (17) of the NREPA that have not fully been addressed through the response activities undertaken pursuant to the approved ROD Amendment. The MDEQ recommends that prospective purchasers or users of the Property undertake appropriate due diligence prior to acquiring or using 1his Property, and undertake appropriate actions to comply with the requirements of Section 20107a of the NREPA.

DEFINITIONS

"Grantee" shall mean the MDEQ , its successor entities, and those persons or entities acting on its behalf;

"Grantor" shall mean the title holder of the Property at the time this Restrictive Covenant and Easement is executed or any future title holder of the Property or some relevant portion of the Property;

"MDEQ" shall mean the Michigan Department of Environmental Quality, its successor entities, and those persons or entities acting on its behalf;

"NREPA" shall mean the Natural Resources and Environmental Protection Act, 1994 PA 451 , as amended, MCI 324.101 *ef seq.;*

"Part 201" shall mean Part 201 , Environmental Remediation, of the NREPA, MCI 324.20101 *et seq.;*

"Property" shall mean the real property legally described in Exhibit 1;

"Response Activities" shall mean, consistent with Section 101 (25) of CERCLA, 42 U.S.C. Section 9601 (25), such actions as have been or may be necessary to conduct any removal , remedy or remedial action, as those terms are defined in Sections 101(23) and 101 (24)

of CERCLA, 42 U.S.C. Sections 9601(23) and 9601(24), on the Property and/or at the Site, including enforcement activities related thereto;

"Site" shall meanthe u..S. Aviex NPL site;

"U.S. EPA" shall mean the United States Environmental Protection Agency, its successor entities and those persons or entities acting on its behalf; and

All other terms used in this document which are defined in Part 3, Definitions, of the NREPA; Part 201 ; or the Part 201 Administrative Rules ("Part 201 Rules"), 2002 Michigan Register 24, effective December 21,2002, shall have the same meaning in this document as in Parts 3 and 201 of the NREPA and the Part 201 Rules, as of the date of execution of this Restrictive Covenant and Easement.

NOW THEREFORE,

For valuable consideration of less than $100.00, the receipt of which is hereby acknOWledged, the Grantor, on behalf of itself, its successors and assigns hereby covenants and declares that the Property shall be subject to the restrictions set forth below, for the benefit of the Grantee, and grants and conveys to the Grantee, and its assigns and representatives, the perpetual right to enforce said restrictions. The Grantor further, on behalf of itself, its successors and assigns does grant and convey to the Grantee and its representatives an environmental protection easement of the nature, character, and purposes set forth below with respect to the Property, and the right to enforce said easement.

1. Restrictions on Land Use:

Allowable uses for the Property located at 1056 Huntly Road, Niles, Michigan, Cass County and legally described in Exhibit 1 shall be in accordance with the ordinances and zoning laws set forth by Howard Township. The Property is currently zoned Low Density Residential. The Howard Township Zoning Ordinance identifies the permissible uses of properties located within the Low Density Residential district. Property-specifiC land use restrictions that are not otherwise identified by local land use limitations and zoning requirements are summarized as follows:

The Grantor shall:

(a) Prohibit activities on the Property designated in Exhibit 2 that may result in exposures above levels established in the ROD Amendment.

(b) Prohibit activities on the Property that may interfere with any element of the ROD Amendment, including the performance of operation and maintenance actiVities, MNA monitoring, or other measures necessary to ensure the effectiveness and integrity of the selected remedy in the ROD Amendment.

2. Restrictions on Activity: The Grantor shall:

(a) Prohibit activities that cause existing contamination to migrate beyond the boundaries of the Property, increase the cost of Response Activities, or otherwise exacerbate the existing contamination located on the Property. The term "exacerbation" is more specifically defined in Section 20101(1)(q) of the NREPA, MCI324.20101(1)(q).

(b) Prohibit and prevent use of the Property in a manner that may interfere with Response Activities at the Property, including interim response, remedial action, operation and maintenance, monitoring, or other measures necessary to assure the effectiveness and integrity of the remedial action. The following is a summary of Restricted Property-specific prohibited activities that are necessary to maintain the effectiveness and integrity of the ROD Amendment:

1. Excavation, removal, or damage to the existing treatment system components including sparge well clusters, conduits, piping, and appurtenances.
2. Excavation, removal, or damage to existing monitoring wells on the Property.
3. Paving over or otherwise restricting access to existing monitoring and sparge wells located on the Property.

(c) Prohibit the construction of and use of wells or other devices on the Property to extract groundwater for consumption, irrigation, or any other use, except for wells and devices that are necessary for Response Activities or testing and monitoring groundwater contamination levels in accordance with plans approved by the MDEQ and the U.S. EPA.

(d) Prohibit all construction of new structures or any modification of existing structures, unless such construction incorporates engineering controls designed to eliminate the potential for subsurface vapor phase hazardous substances at concentrations greater than 'those that are acceptable under the Part 201 Administrative Rules, to migrate into the new or modified structures. Prior to occupancy of any new or modified structures, the Grantor must demonstrate, using then-current MDEQ-approved methodologies, that subsurface vapor phase hazardous substances are not creating unacceptable exposures within the new or modified structures and make such documentation available upon request.

(e) Prohibit any excavation or other activities involving disturbance of soils between 750 feet above Mean Sea level and 740 feet above Mean Sea level on the Property unless conducted in accordance with applicable state and federal environmental and health and safety laws and regulations. Any contaminated soils or groundwater generated by excavation or other activities shall be handled and disposed of in accordance with all applicable local, state, and federal laws and regulations and in a manner that does not cause or result in a new release, exacerbation of existing contamination, or any other violation of local, state, and federal environmental laws and regulations including, but not limited to, Part 201 of the NREPA.

3. Management of Contaminated Soil, Media, and Debris: .The Grantor shall manage all soils, media and/or debris located on the Property in accordance with the applicable requirements of Section 20120c of Part 201, MCI 324.20120c and Part 111, Hazardous Waste Management, of the NREPA, MCI 324.11101 *et seq.;* the Resource Conservation and Recovery Act, 42 U.S.C. Section *6901 et seq.;* the administrative rules promulgated thereunder; and all other relevant state and federal laws and regulations.

4. Access:. The Grantor grants the MDEQ and its representatives the right to enter the Property at reasonable times for the purpose of determining and monitoring compliance with the ROD and with this Restrictive Covenant and Easement, including the right to take samples, inspect the operation of the Response Activities, and, inspect any records relating thereto; and to perform any actions necessary to maintain compliance with Part 201 and the ROD. Further, a GRANT OF EASEMENT, for the benefit of the MDEQ, has been recorded on the Property (Liber 00873, Pages 0183 - 0186). This GRANT OF EASEMENT provides for access to the Property and for the implementation of response activities at the Property.

Nothing in this Restrictive Covenant shall limit or otherwise affect the MDEQ's right of entry and access, or authorities to take Response Activities as defined in this Restrictive

Covenant and Easement, as well as in NREPA, and any successor statutory provisions, or other state or federal law.

5. Term: This Restrictive Covenant and Easement shall run with the land and shall be binding on the Grantor, including persons as set forth in Paragraph 12(e}, Successors.

6. Third Party Beneficiary: The Grantor, on behalf of itself and its successors, transferees, and assigns, hereby agrees that the United States, acting by and through the U.S. EPA, its successors and assigns, shall be a third party beneficiary ("Third Party Beneficiary") of all the benefits and rights set out in the restrictions, covenants, easements, exceptions, notifications, conditions, and agreements herein, and that the Third Party Beneficiary shall have the right to enforce the restrictions described herein as if it was a party hereto. No other rights in third parties are intended by this Restrictive Covenant and Easement, and no other person or entity shall have any rights or authorities hereunder to enforce these restrictions, terms, conditions, or obligations beyond the Grantor, the MDEQ, their successors, assigns, and the Third Party Beneficiary.

7. Enforcement: The State of Michigan, through the MDEQ; and the United States of America, through the U.S. EPA as a Third Party Beneficiary, may enforce the restrictions and grant of easement set forth in this Restrictive Covenant and Easement by legal action in a court of competent jurisdiction.

8. U.S. EPA Entry, Access, and Response Authority: Nothing in this Restrictive Covenant and Easement shall limit or otherwise affect the U.S. EPA's right of entry and access, or authority to undertake Response Activities as defined in this Restrictive Covenant, as well as in CERCLA, the National Contingency Plan, 40 Code of Federal Regulations Part 300, and any successor statutory provisions, or other state or federal law. The Grantor consents to officers, employees, contractors, and authorized representatives of the U.S. EPA entering and having continued access to this Property for the purposes described in Paragraph 4, above.

9. Modification/Release/Rescission: The Grantor may request in writing to the U.S. EPA and the MDEQ, at the addresses provided in Paragraph 11, below, modifications to, or release or rescission of, this Restrictive Covenant and Easement. This Restrictive Covenant and Easement may be modified, released, or rescinded only with the written approval of the U.S. EPA and the MDEQ. Any approved modification to, or release or rescission of, this Restrictive Covenant and Easement shall be filed with the appropriate county Register of Deeds by the Grantor and a certified copy shall be returned to the MDEQ and the U.S. EPA at the addresses prOVided in Paragraph 11, below.

10. Transfer of Interest: The Grantor shall provide notice at the addresses provided in this document to the MDEQ and to the U.S. EPA of the Grantor's intent to transfer any interest in the Property, or any portion thereof, at least fourteen (14) business days prior to consummating the conveyance. A conveyance of title, easement, or other i'nterest in the Property shall not be consummated by the Grantor without adequate and complete provision for compliance with the terms and conditions of this Restrictive Covenant and Easement and the applicable provisions of Section 20116 of the NREPA. The Grantor shall include in any instrument conveying any interest in any portion of the Property, including, but not limited to, deeds, leases, and mortgages, a notice which is in substantially the following form:

NOTICE: THE INTEREST CONVEYED HEREBY IS SUBJECT TO A DECLARATION OF RESTRICTIVE COVENANT AND ENVIRONMENTAL PROTECTION EASEMENT, DATED SEPTEMBER 20. 2011. AND RECORDED WITH THE CASS COUNTY REGISTER OF DEEDS, USER , PAGE _____

11. Notices: Any notice, demand, request, *consent,* approval, or communication that is required to be made or obtained under this Restrictive Covenant and Easement shall be made in writing; include a statement that the notice is being made pursuant to the requirements of this Restrictive Covenant and Easement; include the MOEQ Site 10 number and reference number; and shall be served either personally, or sent via first class mail, postage prepaid, as follows:

For the U.S. EPA:

Director
Superfund Division (SR-6J)
U.S. Environmental Protection Agency, Region 5
77 West Jackson Blvd.
Chicago, IL 60604

with a copy to:

Office of Regional Counsel (C-14J)
U.S. Environmental Protection Agency, Region 5
77 West Jackson Blvd.
Chicago, IL 60604

For the MDEQ:

Chief
Remediation Division
Michigan Department of Environmental Quality
P.O. Box 30426
Lansing, M148909-7926

12. Miscellaneous:

(a) Controlling Law. The interpretation and performance of this Restrictive Covenant and Easement shall be governed by the laws of the United States as to the obligations referred to in the ROD, and by the laws and regulations of the State of Michigan for all other purposes hereunder (without reference to choice of laws and principles thereof). The right to enforce the conditions and restrictions in this Restrictive Covenant and Easement are in addition to other rights and remedies that may be available, including, but not limited to, administrative and judicial remedies under CERCLA or Part 201 of the' NREPA

(b) Construction. Any general rule of construction to the contrary notwithstanding, this Restrictive Covenant and Easement shall be liberally construed to achieve the purpose of this Restrictive Covenant and Easement and the policy and purpose of CERCLA and the land use restrictions and prospective use limitations required by Part 201. If any provision of this Restrictive Covenant and Easement is found to be ambiguous, an interpretation consistent with the purpose of this Restrictive Covenant and Easement that would render the provision valid shall be favored over any interpretation that would render it-invalid.

(c) Severability. If any provision of this Restrictive Covenant and Easement is held to be invalid by any court of competent jurisdiction, the invalidity of such provision shall not affect the validity of any other provision hereof, and all other provisions shall continue unimpaired and in full force and effect.

(d) Entire Agreement This Restrictive Covenant and Easement and its attachments and appendices supersedes all prior discussions, negotiations, understandings, or agreements between the undersigned relating to the matters addressed herein, all of which are merged herein.

(e) Successors. The covenants, terms, conditions, and restrictions of this Restrictive Covenant and Easement shall be binding upon; and inure to the benefit of, the Grantor and Grantee and their agents, successors, lessees, and assigns and any subsequent title holders, occupants or other persons acquiring an interest in the Property or a relevant sub-portion of the Property, and their respective agents, successors and assigns. The rights, but not the obligations or authorities, of the U.S. EPA are freely assignable to any public entity, subject to the notice to the Grantor, its successors and assigns, as their interests appear in the public title records kept and maintained by the Cass County Register of Deeds.

13. Exhibits: The following exhibits are incorporated into this Restrictive Covenant and Easement:

Exhibit 1 - Legal Description of the Property

Exhibit 2 - Survey of the Property

14. Authority to Execute Restrictive Covenant and Easement: The undersigned person executing this Restrictive Covenant and Easement represents and certifies that he or she is duly authorized and has been empowered to execute this Restrictive Covenant and Easement.

IN WITNESS WHEREOF, Michigan land Bank, Fast Track Authority, the Grantor, has caused this Restrictive Covenant and Easement to be executed on *thisU* day of ~~September~~ OCTOBER 2011 .

Signature

Kim Homes

Printed Name .

Executive Director

Title

STATE OF MICHIGAN)

)ss

COUNTY OF WAYNE)

Acknowledged before me in WAYNE County, Michigan, on ~~September~~ OCTOBER 11 *[insert day,]* 2011 by JEFFREY M HUNTINGTON

Notary Public, State of MICHIGAN
County of EATON
My commission expires: 07/20/2012
Acting in the County of WAYNE

The MDEQ approves the form and content of this Restrictive Covenant and Easement on this 26th day of September 2011 .

BY: _____
Lynelle Marolf, Chief
~~Remediation Division~~
Department of Environmental Quality

STATE OF Michigan)
)ss
COUNTY OF Ingham)

Acknowledged before me in Ingham County, Michigan, on September, 26, 2011 by Brian C. Muench

_____

Notary Public, State of Michigan
County of Livingston
My commission expires: 7/3/2012
Acting in the County of INGHAM

This Document Prepared By:
Bradley J. Ermisch
Michigan Department of Environmental Quality
Remediation Division
525 West Allegan Street
Lansing, Michigan 48933-2125

EXHIBIT 1

LEGAL DECRIPTION OF PROPERTY

PARCEL 2
LEGAL DESCRIPTION

A parcel of land described as commencing 924 feet south of the center of Section 29; THENCFSouth 232 feet; THENCE West 660.38 feet; THENCE North 232 feet; THENCE East 660.38 feet to the point of beginning.

CERTIFICATE OF SURVEY

FOR: WESTON SOLUTIONS OF MICHIGAN, INC.

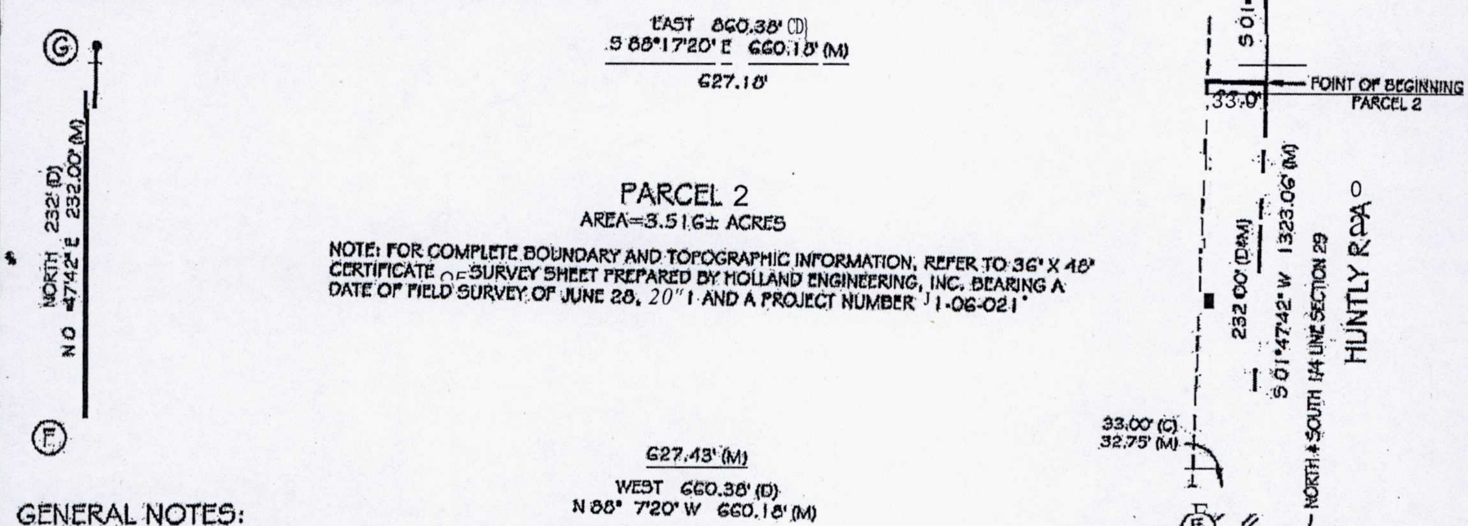
BOUNDARY COORDINATE TABLE

POINT ID	NORTHING	EASTING
A	127,009.10	12,625,542.40
B	125,686.69	12,625,500.96
c	124,364.02	12,625,468.80
E	125,851.93	2,625,506.13
F	125,871.64	12,624,846.25
G	126,103.53	12,624,853.52

FOUND 1" PINCH PIPE IN MONUMENT BOX CENTER POST SECTION 29 TOWN 7 SOUTH, RANGE 16 WEST HOWARD TOWNSHIP, CASS COUNTY, MICHIGAN POINT OF COMMENCEMENT

SCALE 100 50 0 FEET

SEE SHEET 2 OF 2 FOR DESCRIPTION.



NOTE: FOR COMPLETE BOUNDARY AND TOPOGRAPHIC INFORMATION, REFER TO 36" X 48" CERTIFICATE OF SURVEY SHEET PREPARED BY HOLLAND ENGINEERING, INC. BEARING A DATE OF FIELD SURVEY OF JUNE 28, 20"1 AND A PROJECT NUMBER 11-06-021

165.32' (M)

LILAC AVENUE (PLATTED AS PHILLIPS AVENUE) CENTERLINE

S 01°23'34" W 1323.06' (M)

FOUND 1" IRON ROD WITH CASS COUNTY REMON. CAP IN MONUMENT BOX SOUTH 1/4 CORNER SECTION 29 TOWN 7 SOUTH, RANGE 16 WEST HOWARD TOWNSHIP, CASS COUNTY, MICHIGAN REMON. L.C.R.C. LIBER 4, PAGE 328

GENERAL NOTES:

THIS SURVEY WAS PREPARED FORTI'II: LANDS AS DESCRIBED HEREIN. IT IS NOT A CERTIFICATION OF TITLE, ZONING OR FREEDOM OF ENCUMBRANCES.

PROJECT CONTROL WAS BASED ON PREVIOUS PROJECT CONTROL ESTABLISHED BY OTHERS AND WAS FURNISHED TO HOLLAND ENGINEERING, INC. THE NORTHINGS AND EASTINGS ARE BASED ON THE MICHIGAN STATE PLANE COORDINATE SYSTEM, SOUTH ZONE, NAD 83 (1994), SCALED TO GROUND USING 1/COMBINED SCALE FACTOR=1.00004245. THE ELEVATIONS ARE BASED ON NAVD 88 AND WERE GPS DERIVED.

BEARINGS ARE BASED ON THE MICHIGAN STATE PLANE COORDINATE SYSTEM, SOUTH ZONE. NAD 83 (1994).

DISTANCES SHOWN HEREON ARE GROUND DISTANCES.

REMON. = REMONUMENTATION

L.C.R.C. = LAND CORNER RECORDATION CERTIFICATE

SITE ADDRESS: 1056 HUNTLY ROAD, NILES, MICHIGAN

DATE OF FIELD SURVEY: JUNE 28, 2011

STATE OF MICHIGAN DOUGLAS J. LANSKY PROFESSIONAL SURVEYOR NO. 45500 LICENSED PROFESSIONAL SURVEYOR

Date revised	By
Date revised	By

LEGEND:

- o SET 1/2" STEEL ROD WITH CAP #45500
- • FOUND 1/2" IRON PIPE
- FOUND " IRON ROD, NO CAP
- FOUND ," IRON PIPE
- ■ FOUND CONCRETE MONUMENT
- (D) - DESCRIPTION DIMENSION
- (M) - MEASURED DIMENSION
- (C) - COMPUTED DIMENSION
- (P) - PLAT DIMENSION

Horiz. Datum NAD83(94) Vertical Datum N/A

HOLLAND ENGINEERING

ENGINEERING | SURVEYING PIPELINE SERVICES

220 Hoover Boulevard, Suite 2
Holland, Michigan 49423-3766
www.hollandengineering.com
T 616-392-5938 F 616-392-2116

Drawn By MVM

S-T-R SECTION 29, T7S, R16W

Twp. or City HOWARD TOWNSHIP

Job No. 11-06-021(B2)

Douglas J. Lansky
DOUGLAS J. LANSKY
PROFESSIONAL SURVEYOR #45500

L 1038 P 290 Page 15 of 15 71956

CERTIFICATE OF 5URVEY

FOR: WESTON SOLUTIONS OF MICHIGAN, INC.

DESCRIPTION:

PER CHICAGO TITLE OF MICHIGAN RECORD TITLE SEARCH
FILE NO.: 14056434 ICML
CERTIFIED TO: MAY 13, 2011

PROPERTY LOCATED IN THE TOWNSHIP OF HOWARD, COUNTY OF CASS, STATE OF MICHIGAN

PARCEL 2:

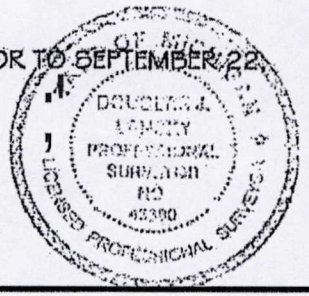
A PARCEL Of LAND DESCRIBED AS COMMENCING 924 fEET50UTH OF THE CENTER OF5ECTION 29, TOWN 7 SOUTH, RANGE 16 WEST; THENCE SOUTH 232 FEET; THENCE WEST 660.38 FEET; THENCE NORTH 232 FEET; THENCE EAST 860.38 FEET To THE POIN" Of BEGINNING.

SUBJECT TO THE FOLLOWING ITEMS PER
CHICAGO TITtEOF MICHIGAN RECORD TITLE SEARCH
FILE NO.: 14056434 ICML
CERTIFIED TO: MAY 13, 2011:

(1) GRANT OF EASEMENT RECORDED ON 12/10/2003, IN LIBER 873, PAGES 183-186.

AN EA5EMENT IN GROSS, THE PURPOSE BEING FOR THE PERFORMANCE OF NECESSARY RESPONSE ACTIVITIES AT THE U.S. AVIEX FACILITY (FACILITY), FOR THE PARCEL IDENTIFIED AS PARCEL 2 AS SHOWN HEREON. THE ANTICIPATED RESPONSE ACTIVITIES INCLUDE, BUT ARE NOT LIMITED TO, UTILIZATION OF EXISTING UTILITIES LOCATED ON THE PROPERTY; REMEDIAL INVESTIGATION; INSTALLATION, OPERATION, INSPECTION, MAINTENANCE, REPAIR, AND REPLACEMENT OF FREE PRODUCT RECOVERY SYSTEMS AND GROUNDWATER TREATMENT FACILITIES; THE,EVALUATION AND POTENTIAL REMOVAL, TREATMENT OR EXPOSURE CONTROL RELATED TO ABANDONED HAZARDOUS SUBSTANCES, OR TO VAPOR, SOIL, SURFACE WATER, OR SEDIMENTS CONTAMINATED BY HAZARDOUS SUBSTANCES; AND THE PLACEMENT OF LAND-USE RESTRICTIONS NECESSARY TO PROTECT THE rU6LICHEALTH, SAFETY, AND WELfARE, AND THE ENVIRONMENT.

NOTE: THE RECORD TITLE SEARCH DID NOT EXAMINE ANY DOCUMENTS RECORDED PRIOR TO SEPTEMBER 22, 2003.



Date revised --	By
Date revised	By

LEGEND:

- O SET 1/2" STEEL ROD WITH CAP #45500
- • FOUND 1/2" IRON PIPE
- ⊙ FOUND 1" IRON ROD - NO CAP
- ⊕ FOUND IRON PIPE
- ■ FOUND CONCRETE MONUMENT
- (D) - DESCRIPTION DIMENSION
- (M) - MEASURED DIMENSION
- (C) - COMPUTED DIMENSION
- (F) - FIELD DIMENSION

Horiz. Datum NAD83(94) | Vertical Datum N/A

HOLLAND ENGINEERING, INC.
ENGINEERING | SURVEYING | PIPELINE SERVICE
220 Hoover Boulevard, Suite 2
Holland, Michigan 49423-3766
www.hollandengineering.com
T 616-392-5938 F 616-392-2116

S-T-R
SECTION 29, T7S, R16W
Twp. or City
HOWARD TOWNSHIP
Job No.
11-06-021(B2)

Douglas J. Linsky
DOUGLAS J. LINSKY
PROFESSIONAL SURVEYOR #45500

RECD 2012 OCT 19 AM 11:04

2012 NOV 15 AM 11:25

80572 Pages: 3 L: 1050 P: 1261
RECORDED Cass County, Michigan
Barbara Runyon, Register of Deeds
11/15/2012 12:00 PM
Receipt #71555 Fee: $20.00 DQC

QUITCLAIM DEED

THE STATE OF MICHIGAN, by the **MICHIGAN LAND BANK FAST TRACK AUTHORITY**, Grantor, whose address is 300 North Washington Square, Lansing, Michigan, 48913, by authority of MCL 124.757, for Twelve Thousand Five Hundred and No/100 Dollars ($12,500.00), paid by **AVX Properties, LLC, Grantee, a Michigan Limited Liability Company,** whose address is **1067 Bame Avenue, Niles, Michigan 49120**, quitclaims to Grantee the following described real Property (Property) in the **Township of Howard, County of Cass, State of Michigan**:

See Attachment A for Property Description

Subject to all easements, encumbrances, and restrictions of record, if any. and including the following:

Grantor reserves to the State of Michigan all aboriginal antiquities including mounds, earthworks, forts, burial and village sites, mines, and other relics, on, within, or under the Property, with power to the State of Michigan, and all others acting under its authority, to enter the Property for any purpose related to exploring, excavating, and taking away aboriginal antiquities.

Grantor reserves to the State of Michigan all rights in minerals, coal, oil, and gas (excluding sand, gravel, or clay) on, within, or under the Property, with power to the State of Michigan, and all others acting under its authority, to enter the Property for any purpose related to accessing, exploring, mining, removing, and storing the minerals, coal, oil, and gas.

Grantor reserves to the State of Michigan an undivided fifty percent interest (50%) in and to all royalties payable to the Grantee, or any successor or assign of the Grantee, including any lessee, under every oil and gas lease, mineral lease, or any other agreement authorizing the removal or extraction of any oil, gas, coal, or other minerals or mineral products, including both metallic and nonmetallic minerals, from the Property. The Grantee, its successors, assigns, or lessees shall remit payment of the State of Michigan's fifty percent (50%) interest in royalties by a check payable to: The State of Michigan Land Bank Fast Track Authority. The State of Michigan has the right to audit all relevant records of any Grantee, successor, assignee, or lessee to determine compliance with this reservation.

The Property may be located within the vicinity of farm land or a farm operation. Generally accepted agricultural and management practices which may generate noise, dust, odors, and other associated conditions may be used and are protected by the Michigan Right To Farm Act, MCL 286.471 *et seq.*

The terms of this conveyance apply to the administrators, successors, and assigns of the parties.

NOTICE ONE: THE INTEREST CONVEYED HEREBY IS SUBJECT TO A DECLARATION OF RESTRICTIVE COVENANT AND ENVIRONMENTAL PROTECTION EASEMENT, DATED OCTOBER 11, 2011 AND RECORDED WITH THE CASS COUNTY REGISTER OF DEEDS, LIBER 1038, Pages 276.

NOTICE TWO: THE INTEREST CONVEYED HEREBY IS SUBJECT TO A DECLARATION OF RESTRICTIVE COVENANT AND ENVIRONMENTAL PROTECTION EASEMENT, DATED OCTOBER 11, 2011 AND RECORDED WITH THE CASS COUNTY REGISTER OF DEEDS, LIBER 1038, Pages 291.

3

STATE OF MICHIGAN
LAND BANK FAST TRACK AUTHORITY

By: Kim Homan
Its: Executive Director

Date: 10/10/12

State of Michigan)
)
County of Ingham)

This instrument was acknowledged before me on October 10, 2012, by Kim Homan, Executive Director of the Michigan Land Bank Fast Track Authority, a public body corporate and politic, on behalf of the State of Michigan.

Signature

Printed name exactly as it appears on application for commission as a notary public.

Notary Public, State of Michigan, County of Macomb.
My commission expires July 4, 2014.
Acting in the County of Ingham

This Instrument Drafted By:

Kevin Francart
Deputy Director and General Counsel
Michigan Land Bank Fast Track Authority
300 North Washington Square
Lansing, Michigan 48913

After Recording, Return To:

Kim Homan
Executive Director
Michigan Land Bank Fast Track Authority
300 North Washington Square
Lansing, Michigan 48913

THIS INSTRUMENT IS EXEMPTED FROM
THE REAL ESTATE TRANSFER TAX ACT BY MCL 207.505(h)(i)
AND THE STATE REAL ESTATE TRANSFER TAX ACT BY MCL 207.526(h)(i)

ATTACHMENT A
Property Description

County of Cass, State of Michigan:

Township of HOWARD
Town 07 South, Range 16 West, Section 29
Pt of SW 1/4 Sec com 748 ft S of cen Sec, th S 176 ft, W 495 ft, N 176 ft, E 495 ft to pob. 2 A.
1 - Possible Contamination - See Footnote at end of Exhibit A
18 - DEQ Easement - See Footnote at end of Exhibit A

Com 924 ft S of cen of Sec, th W 660.38 ft, S 232 ft, E 660.38 ft, N 232 ft to beg.
1 - Possible Contamination - See Footnote at end of Exhibit A
18 - DEQ Easement - See Footnote at end of Exhibit A

For parcels identified as "1 - Possible Contamination - See Footnote at end of Exhibit A", the following shall apply:

1 - Possible Contamination. By accepting this Document, the Second Party for itself, its successors and assigns, agree to be bound by and comply with the following covenants that shall run with the land herein conveyed:

I. Not to sue the State of Michigan, or any of its departments, boards, commissions, officers, employees or agents for any claim whether legal or equitable, arising under, or in any manner related to this Document. To release, waive, and discharge the State of Michigan and all its departments, boards, commissions, officers, employees and agents from any and all liability to the Second Party, its officers, employees and agents, and its successors and assigns for all losses, injury or damage to person or property, or death, and any claims or demands therefore, arising under, or in any manner related to this Document.

II. To indemnify and save harmless the State of Michigan, and all of its departments, agencies, boards, commissions, officers, employees, and agents from any and all claims, demands, judgments, and expenses, including attorney fees, for any and all loss damage, death, or injury to person or property, arising under, or in any manner related to the performance of, this Document.

For parcels identified as "18 - DEQ Easement - See Footnote at end of Exhibit A", the following shall apply:

18 - DEQ Easement. The Department of Environmental Quality has filed an easement to this property which provides for access to the property and for the implementation of response activities at the property by the Grantee Parties acting under authority set forth in Sections 20117(3)(e) and 20118 of the NREPA. The anticipated response activities may include, but are not limited to, demolition; remedial investigation; installation, operation, inspection, maintenance, repair, and replacement of free product recovery systems and groundwater treatment facilities; the evaluation and potential removal, treatment or exposure control related to abandoned hazardous substances, or to vapor, soil, surface water, or sediments contaminated by hazardous substances; and the placement of land-use restrictions necessary to protect the public health, safety, and welfare, and the environment.

CHAPTER 11

L-1 LIGHT INDUSTRIAL DISTRICT

Section 11.01 INTENDED PURPOSES

Intended to provide sites for heavy commercial and light manufacturing activities employing relatively large numbers of people. Industrial uses would generally be located on sites of not more than ten (10) acres and activities would be of such a nature that they do not create serious problems of compatibility with other kinds of adjacent land use. Such use shall not create objectionable noise, vibration or odor and must not exceed any state law or regulations. Permitted commercial uses would be those which are most appropriately located as neighbors of industrial uses or which are necessary to serve the immediate needs of the people in these districts. Truck traffic and loading operations are expected to be characteristic of the districts.

Section 11.02 PERMITTED USES

In the Light Industrial District, buildings and premises may be used, and buildings may be erected or structurally altered for the following uses only:

Permitted Uses

1. Cleaners and laundries
2. Contractors
3. Equipment repair
4. Fabrication assembly and packaging
5. Food processing
6. Grinding, milling, and production
7. Material handing and equipment
8. Motor vehicle services
9. Repair services
10. Warehousing, storage movers
11. Wholesaling
12. Other uses similar in character to the above and not listed specifically

Section 11.03 CONDITIONAL USES

Uses permitted with a conditional use permit

1. Freight terminals

2. Other uses similar in character to the above and not listed specifically

Section 11.04 DEVELOPMENT STANDARDS

A. **Height.** The maximum height of buildings an other structures erected or enlarged in this district shall be thirty-five (35) feet, except that such height may be increased to a maximum of sixty-five (65) feet, provided that for every foot of height in excess of thirty-five (35) feet, there shall be added to each yard requirement one (1) corresponding foot of width and depth.

B. **Front yards.** There shall be a front yard on each lot which shall be not less than fifty (50) feet in depth.

C. **Side yards.**

1. On each interior lot, there shall be two (2) side yards, each side yard having a width of not less than twenty-five (25) feet, except as hereinafter provided in Subsection F hereof.

2. On each corner lot, there shall be two (2) side yards, the side yard abutting the street having width of not less than fifty (50) feet and the side yard not abutting the street having a width of not less than twenty-five (25) feet, except as hereinafter provided in Subsection F hereof.

D. **Rear yard.** There shall be a rear yard on each lot the depth of which shall be not less than fifty (50) feet, except as hereinafter provided in Subsection E hereof.

E. **Building coverage.** Not more than fifty (50) percent of the area of any lot shall be occupied by buildings.

F. **Lots abutting residential districts.** Unless authorized as a special exception, in no case shall any building or structure be erected closer than one hundred (100) feet to any residential district nor shall any parking area be closer than forty (40) feet to any residential district, which forty (40) foot area between such parking lot and such residential district shall be maintained as green area entirely covered by grass, shrubs, and/or trees. See Off-Street Parking Regulations Chapter 17.

G. Sign requirements will be in accordance with the provisions of Chapter 15 of this Ordinance.

H. A site plan review will be prepared according to the provisions of Chapter 18.

CHAPTER 12

M - MANUFACTURING DISTRICT

Section 12.01 DESCRIPTION AND PURPOSE

The Manufacturing District is designed to provide areas suitable for development as heavy industrial sites, and at the same time, protect such industrial developments from the intrusion of nonindustrial uses which impede the full utilization of properly located sites for industrial purposes. These uses would generally acquire a larger site of more than ten (10) acres and may be of such a nature that they may require isolation from many other kinds of uses. No use is permitted which violates any local, state or federal pollution control law or regulation.

Section 12.02 PERMITTED USES

A building or other structure may be erected, altered, or used, and a lot may be occupied or used for any of the following purposes:

1. Cleaners and laundries
2. Contractors
3. Equipment repair
4. Fabrication assembly and packaging
5. Food processing
6. Grinding, milling and production
7. Material handling and equipment
8. Motor vehicle services
9. Repair services
10. Warehousing, storage movers
11. Wholesaling
12. Bulk storage
13. Food Processing
14. Handling and processing of construction materials
15. Manufacturing
16. Processing and handling of raw materials

enclosure, street, equipment, or facility used or intended for use as temporary park, subject to conditions set forth in the Mobile Home Commission Rules and Michigan Public Act 419 of 1976, as amended.

MOBILE HOME LOT: An area within a mobile home park which is designated for the exclusive use of the occupants of a specific mobile home.

MOTEL: A series of attached, semi-detached, or detached rental units which may or may not be independently accessible from the outside parking area consisting of a minimum of a bedroom and bath, occupied for hire, in which a minimum of fifty percent (50%) plus one (1) of the units feature exterior entrances, and which provides customary motel services such as maid service, linen service, telephone and/or desk service, and the use of furniture. No kitchen or cooking facilities are to be provided with the exception of units for use of the manager and/or caretaker.

MOTOR HOME: A motorized vehicular unit primarily designed for travel and/or recreational usage, which may also contain facilities for overnight lodging. This term does not apply to mobile home.

MUNICIPALITY: The word "municipality" shall mean the Township of Howard, Cass County, Michigan.

NATURAL FEATURES: Natural features shall include soils, wetlands, floodplains, water bodies and channels, topography, trees and other types of vegetative cover, and geologic formations.

NONCONFORMING BUILDING: A building or portion thereof that was lawfully in existence at the effective date of this Ordinance, or amendments thereto, and which does not now conform to the minimum building height, area, setback, lot coverage or other provision of this Ordinance pertaining to buildings in the zoning district in which it is located.

NONCONFORMING LOT: A lot which was lawfully in existence at the effective date of this Ordinance, or amendments thereto, and which does not now conform to the lot size, lot width, or other provisions of this Ordinance pertaining to lots in the zoning district in which it is located.

NONCONFORMING USE: A use which was lawfully in existence at the effective date of this Ordinance, or amendment thereto, and which does not now conform to the use regulations of this Ordinance for the zoning district in which it is now located.

SECTION 326 ESSENTIAL SERVICES

1. It shall be lawful for essential services, as defined herein, to establish facilities and conduct operations in any district of the City, except as hereinafter provided.

2. The erection or construction of any building or structure for essential services, including but not limited to electrical substations, gas regulator stations, wastewater or storm water facilities, or other similar facilities shall be designed and erected to conform harmoniously with the general architecture and plan of such district in which they are to be erected, shall not interfere with the planned use of such district, and shall be subject to the prior approval of the Planning Commission. Plans and specifications for such building or structure shall be tendered to the Zoning Administrator and the Planning Commission as a prerequisite of such approval. The Planning Commission may permit any essential service to erect and use an essential service building or structure in any permitted district, to a greater height or of a greater area than the district requirements established, provided the Planning Commission shall first find such structure or building necessary for public convenience and necessity.

SECTION 327 WELLHEAD PROTECTION AREA

1. **Intent and Purpose:** To protect groundwater quality in the delineated wellhead protection areas identified in the *City of Niles Wellhead Protection Plan*; to provide a mechanism which safeguards potable water supplies from existing and potential future sources of contamination; to prevent pollutants from entering surface and groundwater; and to ensure safe, potable, and plentiful water resources for current and future residents.

2. **Scope:** The standards in this **Section 327** shall apply to the whole of any parcel and land uses located within the Wellhead Protection Area as illustrated on the Wellhead Protection Area Map prepared by the City and approved by the Michigan Dept. of Environmental Quality. The regulations in this section are intended to augment and be in addition to any standard or rule concerning groundwater protection promulgated by federal, state, or local agencies. Where the requirements of this **Section 327** conflict with other regulations or requirements promulgated or followed by the City of Niles, the most restrictive standards shall apply.

3. **General Requirements.**

   a. The following uses shall be permitted by right within the Wellhead Protection Area:

      1) Single-family residential uses.

      2) Parks and other recreational facilities.

   b. Other uses, including all non-residential and non-recreational uses, shall be permitted as Special Uses, and in addition to the provisions of **Article Eight**, shall comply with the following standards:

      1) All uses shall connect to municipal sanitary sewer systems and public water supplies; unless the Zoning Administrator concludes that these utilities are not readily available or cannot be made readily available to serve the use.

2) Temporary outdoor storage areas shall be a minimum of one hundred (100) feet from any creek, stream, river, pond, or wetland; and any runoff shall be diverted away from such water body.

3) Garbage, trash, refuse, junk vehicles, junk appliances, toxic substances, and similar materials, shall not be dumped or stored outside a protected structure or container.

4) Exterior aboveground holding tanks shall include, at a minimum, the following: a monitoring system and secondary standpipe above the 100-year flood level; and an impervious dike above the 100-year flood level capable of containing 110% of the largest volume of storage, provided with an overflow recovery catchment area or sump.

5) Open liquid waste ponds shall be prohibited.

6) Loading and unloading areas where hazardous substances and waste materials are handled shall be enclosed or roofed with secondary containment isolated from floor drains. Loading and unloading areas shall have impervious surfaces and be designed to prevent releases onto the ground or into a water body or to groundwater.

7) The applicant shall demonstrate to the Zoning Administrator that on-site storm water will not have an adverse effect on groundwater, with respect to: the planned use of natural and man-made mechanisms to purify storm water through settling out solids, separation and capture of oil and grease, absorption of particulates, and uptake of dissolved solids. Storm water shall be treated prior to infiltration or controlled surface water discharge.

8) Storage of hazardous substances and waste materials shall be isolated in roofed or enclosed areas so as to prevent contact with precipitation. If exposure of storage areas is permitted, uncovered storage areas shall have a separate storm water collection system which discharges to a holding tank.

4. Additional Site Plan Requirements.

a. In addition to the stipulations of **Article Ten** and **Article Eight**, an application for a proposed Special Use shall demonstrate the following:

1) Secondary containment, where land uses store, handle, or use hazardous or toxic substances.

2) Proposed storm water management.

3) Soil erosion control mechanisms, where buildings or structures are proposed within one hundred (100) feet of a water body or wetland.

4) The reduction, to the maximum extent possible, in discharge of runoff and sediments and hazardous or toxic substances into groundwater from parking areas or other impervious surfaces.

5) Identification of all storage areas containing chemicals, liquids, and underground facilities.

6) An *Environmental Checklist for Site Plan Review* shall be submitted with the application.

5. Conditions and Modifications.

a. The Zoning Administrator and Planning Commission shall reserve the right to impose conditions on an applicant. Such conditions shall be related to minimizing adverse effects on groundwater within the Wellhead Protection Area, and may include, but not be limited to, the recommendations of the *City of Niles Wellhead Protection Plan*.

b. After a site plan is approved or recommended for approval by the Planning Commission, no modifications to a site plan shall be made without review and approval as if the proposal were a new application.

6. Nonconforming Uses and Structures.

a. If a land use, building, or structure, which conflicts with the standards of this Section, existed prior to the effective date of this Ordinance, then:

1) Such nonconforming use, building, or structure shall not be moved in whole or in part, added to, extended or expanded, reconstructed, or structurally altered, unless the modification will reduce the extent of nonconformity and improve groundwater protection on the property, in the opinion of the Zoning Administrator.

2) It shall be unlawful to alter the contour of the land or to change the type of land use or type of occupancy of any building or structure, unless the modification will reduce the extent of nonconformity and improve groundwater protection on the property, in the opinion of the Zoning Administrator.

3) Modification on the property shall not be permitted until the Zoning Administrator has issued for such intended modification a Zoning Compliance Permit.

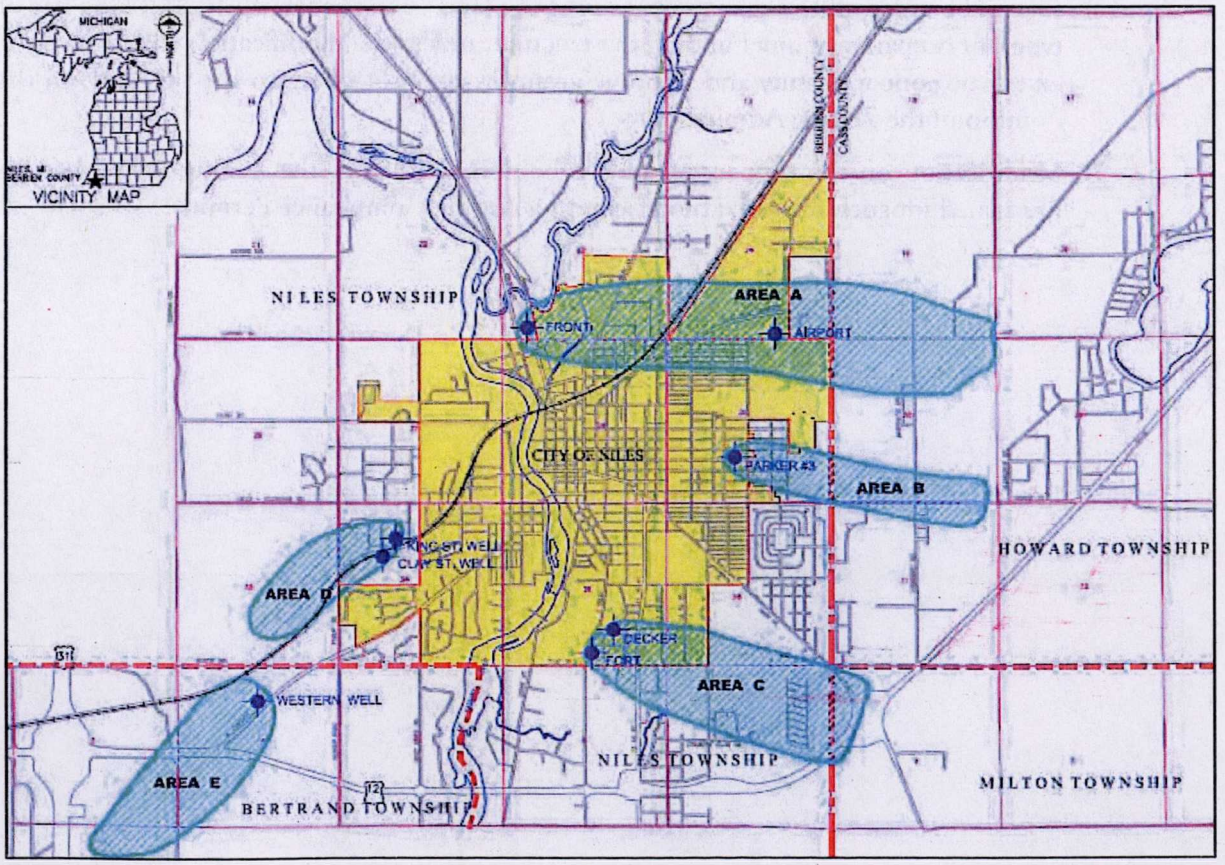
7. Determination of Wellhead Protection Overlay Zone Boundaries.

In determining the location of properties within the Wellhead Protection Overlay Zone, the following rules shall apply:

a. The Water Superintendent or Zoning Administrator shall have the authority to interpret the Wellhead Protection Overlay Zone Map and determine where the boundaries of the different zones fall, if in dispute. The interpretation of the map boundaries may be appealed to the Zoning Board of Appeals pursuant to Article 12 of this Ordinance.

b. The Wellhead Protection Overlay Zone Map may be modified from time to time based on the recommendation of the City of Niles Wellhead Protection Committee. Modifications shall be based on revisions to the map and the 1-year, 5-year, and 10-year time of travel capture zones. The City Council shall approve any changes to the Wellhead Protection Overlay Zone Map.

Wellhead Protection Overlay Zone Map



EPA Begins Review of the U.S. Aviex Superfund Site

Niles, Michigan

The U. S. Environmental Protection Agency is conducting a five-year review of the U.S. Aviex Superfund site at 1056 Huntly Road in Niles, Michigan. The Superfund law requires regular checkups of sites that have been cleaned up – with waste managed on-site – to make sure the cleanup continues to protect people and the environment. This is the fourth five-year review of this site.

EPA's cleanup included removing contaminated soil on-site and installing extraction wells to pump out and treat contaminated groundwater before discharging to surface water. As site conditions changed, EPA modified the remedy in 2004 to treat groundwater contamination in place and to regularly monitor the contaminant levels. Residents with private wells located within or downgradient of the contaminated groundwater plume have been connected to the Niles Municipal Water supply. Land use restrictions prohibit the use of groundwater in the area.

More information is available at the Niles District Library, 620 East Main Street Niles, MI, and at http://www.epa.gov/region5/cleanup/usaviex/index.html. The review should be completed by December 2015.

The five-year review is an opportunity for you to tell EPA about site conditions and any concerns you have. Contact:

Cheryl Allen
Community Involvement Coordinator
312-353-6196
allen.cheryl@epa.gov

Sheila Sullivan
Remedial Project Manager
312-886-5251
sullivan.sheila@epa.gov

You may also call EPA toll-free, 800-621-8431, 8:30 a.m. to 4:30 p.m., weekdays.

Attachment 7

Documents Used to Prepare the U.S. Aviex Site Five-Year Review

1. United States Environmental Protection Agency (U.S.EPA) Region 5 Chicago, Illinois. "Record of Decision for the U.S. Aviex Site", Sept 7, 1988.

2. United States Environmental Protection Agency (U.S. EPA) Region 5 Chicago, Illinois. "Explanation of Significant Differences, U.S. Aviex Site, Niles, Howard Township, Cass County, Michigan", September 23, 1993.

3. City of Niles Zoning Ordinance, Article 3, Section 327, Wellhead Protection Area, Pages 3-20 to 3-22, June 2000.

6. Weston Solutions of Michigan, Inc. "Ground Water Monitoring Plan, Former U.S. Aviex Site, Niles, Michigan", December 2003.

7. Grant of Easement, State of Michigan Department of Environmental Quality, Recorded December 10, 2003, Liber No. 00873, Pages 0183-0190.

8. Weston Solutions of Michigan, Inc. "Well Head Protection Analysis of Former U.S. Aviex Site, Niles, Michigan", May 2004.

9. United States Environmental Protection Agency (U.S. EPA) Region 5, Chicago, Illinois. "Record of Decision Amendment to the Remedial Action, U.S. Aviex Superfund Site, Cass County, Michigan", September 2004.

10. Howard Township Zoning Ordinance, Chapter 11, L-1 Light Industrial District, Chapter 11, L-1 Light Industrial District, Chapter 12, M-Manufacturing District, Zoning Definitions, McKenna Associates, Inc.

11. Declaration of Restrictive Covenant and Grant of Environmental Protection Easement, Exhibit 1 (October 11, 2011), Recorded March 5, 2012, Liber No. 1038, Page 276, Cass County Registry of Deeds.

    - Parcel 1 (Tax ID No. 14-020-029-063-00) – U.S. Aviex Superfund Site, Cass County, Michigan, MDEQ Site ID No. 14000017, U.S. EPA Site No. MID980794556, MDEQ Reference No. RC-RD-201-11-020.

    - Parcel 2 (Tax ID No. 14-020-029-074-00) – U.S. Aviex Superfund Site, Cass County, Michigan, MDEQ Site ID No. 14000017, U.S. EPA Site No. MID980794556, MDEQ Reference No. RC-RD-201-11-021.

12. United States Environmental Protection Agency (U.S. EPA) Region 5, Chicago, Illinois. "Third Five-Year Review Report, U.S. Aviex, Cass County, Niles, Michigan", November 24, 2011.

13. United States Environmental Protection Agency (U.S. EPA) Region 5, Chicago, Illinois. "Site wide Ready for Anticipated Use Determination for the U.S. Aviex, Cass County, Niles, Michigan", January 29, 2013.

14. Weston Solutions of Michigan, Inc. "DRAFT Technical Memorandum for: Annual Groundwater Monitoring - Contaminant Trend Evaluation – 2012, U.S. Aviex Site, Niles, Michigan. Prepared for MDEQ Remediation and Redevelopment Division, Superfund Section, Lansing District Office. October 2013.

15. Weston Solutions of Michigan, Inc. "DRAFT Technical Memorandum for: Annual Monitored Natural Attenuation Evaluation – 2012, U.S. Aviex Site, Niles, Michigan. Prepared for MDEQ Remediation and Redevelopment Division, Superfund Section, Lansing District Office. October 2013.

16. Weston Solutions of Michigan, Inc. "DRAFT Technical Memorandum for: Annual Groundwater Monitoring - 2012, U.S. Aviex Site, Niles, Michigan. Prepared for MDEQ Remediation and Redevelopment Division, Superfund Section, Lansing District Office. November 2013.

17. Weston Solutions of Michigan, Inc. "DRAFT Technical Memorandum for: Vapor Intrusion Screening Assessment, U.S. Aviex Site, U.S. Aviex Site, Niles, Michigan. Prepared for MDEQ Remediation and Redevelopment Division, Superfund Section, Lansing District Office, November 2013.

18. Weston Solutions of Michigan, Inc. "DRAFT Technical Memorandum for: Annual Groundwater Monitoring - 2013, U.S. Aviex Site, Niles, Michigan. Prepared for MDEQ Remediation and Redevelopment Division, Superfund Section, Lansing District Office, November 2014.

19. Weston Solutions of Michigan, Inc. "DRAFT Technical Memorandum for: Annual Monitored Natural Attenuation Evaluation – 2013, U.S. Aviex Site, Niles, Michigan. Prepared for MDEQ Remediation and Redevelopment Division, Superfund Section, Lansing District Office, November 2014.

OSWER No. 9355.7-03B-P

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: U.S. Aviex Site	**Date of inspection:** 11/13/14
Location and Region: Niles, Cass County, MI	**EPA ID:** MID980794556
Agency, office, or company leading the five-year review: U.S. EPA	**Weather/temperature:** Cold ~ 26°F, Snowy, Cloudy, Snow cover ~ 1.5 inches

Remedy Includes: (Check all that apply)

- Landfill cover/containment
- X Access controls
- X Institutional controls
- Groundwater pump and treatment
- Surface water collection and treatment
- X Monitored natural attenuation
- Groundwater containment
- Vertical barrier walls
- Other original remedy included groundwater pump and treat, and ozone/air sparging

Attachments: Inspection team roster attached Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Daniel Liebau (Name) Site Manager, WESTON (Title) Various dates (Date)
   Interviewed at site at office (by phone) Phone no. 906-523-5569
   Problems, suggestions; Report attached _____

2. **O&M staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed at site at office by phone Phone no. _____
   Problems, suggestions; Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency MDEQ, Lansing Dist. Office
Contact Matthew Williams (Name) | Project Mgr. (Title) | 11/13/14 (Date) | 517-284-5171 (Phone no.)
Problems; suggestions; Report attached ✓

Agency MDEQ
Contact Jason Hendey, Geologist (Name) | Geologist (Title) | 11/13/14 (Date) | (Phone no.)
Problems; suggestions; Report attached ✓

Agency City of Niles, MI
Contact Jeff Dunlap (Name) | Utilities Manager (Title) | 11/13/14 (Date) | 269.683.4700 ext. 2020 (Phone no.)
Problems; suggestions; Report attached ✓

Agency City of Niles, MI
Contact Johnny Hall (Name) | Water Utility Operator-in-Charge (Title) | 11/13/14 (Date) | (Phone no.)
Problems; suggestions; Report attached See attached

4. **Other interviews** (optional) Report attached.

Adam Christie, Site owner (574)532-1947

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1.	**O&M Documents**			
	O&M manual	√ Readily available	Up to date	N/A
	As-built drawings	Readily available	Up to date	(N/A)
	Maintenance logs	Readily available	Up to date	(N/A)
	Remarks: O&M Manual is essentially the MNA Plan. This plan is documented when groundwater monitoring & MNA Reports are released semi-annually			
2.	**Site-Specific Health and Safety Plan**	√ Readily available	Up to date	N/A
	Contingency plan/emergency response plan	Readily available	Up to date	N/A
	Remarks: Information kept at WESTON and MDEQ			
3.	**O&M and OSHA Training Records**	Readily available	Up to date	N/A
	Remarks:			
4.	**Permits and Service Agreements**			
	Air discharge permit	Readily available	Up to date	(N/A)
	Effluent discharge	Readily available	Up to date	(N/A)
	Waste disposal, POTW	Readily available	Up to date	(N/A)
	Other permits	Readily available	Up to date	(N/A)
	Remarks:			
5.	**Gas Generation Records**	Readily available	Up to date	(N/A)
	Remarks:			
6.	**Settlement Monument Records**	Readily available	Up to date	(N/A)
	Remarks:			
7.	**Groundwater Monitoring Records**	√ Readily available	√ Up to date	N/A
	Remarks: WESTON Solutions of Houghton, MI and MDEQ maintain monitoring records			
8.	**Leachate Extraction Records**	Readily available	Up to date	(N/A)
	Remarks:			
9.	**Discharge Compliance Records**			
	Air	Readily available	Up to date	(N/A)
	Water (effluent)	Readily available	Up to date	(N/A)
	Remarks:			
10.	**Daily Access/Security Logs**	Readily available	Up to date	(N/A)
	Remarks: Site is owned by commercial business that keep their own information			

IV. O&M COSTS

1. **O&M Organization**
   State in-house — ✓ Contractor for State – WESTON
   PRP in-house — Contractor for PRP
   Federal Facility in-house — Contractor for Federal Facility
   Other WESTON performs semi-annual groundwater monitoring and other investigatory work onsite. –

2. **O&M Cost Records**
   ✓ Readily available ✓ Up to date
   Funding mechanism/agreement in place
   Original O&M cost estimate See attached Report Breakdown attached

   Total annual cost by year for review period if available

   From ____ Date To ____ Date ____ Total cost Breakdown attached
   From ____ Date To ____ Date ____ Total cost Breakdown attached
   From ____ Date To ____ Date ____ Total cost Breakdown attached
   From ____ Date To ____ Date ____ Total cost Breakdown attached
   From ____ Date To ____ Date ____ Total cost Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**
   Describe costs and reasons: Higher costs over last few years due to increased monitoring frequency from 2012, 2013, 2014 frequency was changed from annual to semi-annual Also – Vapor Intrusion measurements taken

   See Attached Report

V. ACCESS AND INSTITUTIONAL CONTROLS Applicable N/A

A. Fencing

1. **Fencing damaged** Location shown on site map (Gates secured) N/A
   Remarks Fencing in good shape -- 8 ft w/ barbed wire top gates locked. Two small holes in North+West areas will be repaired

B. Other Access Restrictions

1. **Signs and other security measures** Location shown on site map N/A
   Remarks Signs posted on each perimeter fence – visible and in good condition

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented — Yes (No) N/A
Site conditions imply ICs not being fully enforced — Yes (No) N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Self-reporting
Frequency No specific frequency specified
Responsible party/agency MDEQ has Declaration of Restrictive Covenant with site owner
Contact Matt Williams (Name) Project Mgr (Title) 11/13/14 (Date) _____ (Phone no.)

Reporting is up-to-date — Yes No N/A
Reports are verified by the lead agency — Yes No N/A

Specific requirements in deed or decision documents have been met — (Yes) No N/A
Violations have been reported — (Yes) No N/A
Other problems or suggestions: (Report attached)
Procedures need to be put in place to make sure ICs are maintained and monitored. Long-Term stewardship procedures are not in place fully.

2. **Adequacy** — ICs are adequate — ICs are inadequate — N/A
Remarks There is ~~evidence~~ a possibility that two properties using irrigation wells have not recorded a restrictive covenant prohibiting private well use for potable water

D. General

1. **Vandalism/trespassing** — Location shown on site map — (No vandalism evident)
Remarks _____

2. **Land use changes on site** N/A
Remarks Since last FYR in 2009, site was sold to owner who uses it for Commercial boat/RV storage. Land zoned Light Industrial now.

3. **Land use changes off site** (N/A)
Remarks None

VI. GENERAL SITE CONDITIONS

A. Roads (Applicable) N/A

1. **Roads damaged** — Location shown on site map — Roads adequate — N/A
Remarks Roads in good shape, no wash-out. Site is accessible

B. Other Site Conditions

Remarks Site is generally well maintained, as it is now privately owned by a commercial enterprise. The general appearance of the site has improved.

VII. LANDFILL COVERS

Applicable N/A

A. Landfill Surface

1. **Settlement** (Low spots) Location shown on site map Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Cracks** Location shown on site map Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks_____

3. **Erosion** Location shown on site map Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Holes** Location shown on site map Holes not evident
   Areal extent_____ Depth_____
   Remarks_____

5. **Vegetative Cover** Grass Cover properly established No signs of stress
   Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____

6. **Alternative Cover (armored rock, concrete, etc.)** N/A
   Remarks_____

7. **Bulges** Location shown on site map Bulges not evident
   Areal extent_____ Height_____
   Remarks_____

8. **Wet Areas/Water Damage** — Wet areas/water damage not evident
   - Wet areas — Location shown on site map — Areal extent _____
   - Ponding — Location shown on site map — Areal extent _____
   - Seeps — Location shown on site map — Areal extent _____
   - Soft subgrade — Location shown on site map — Areal extent _____

   Remarks _____

9. **Slope Instability** — Slides — Location shown on site map — No evidence of slope instability
   Areal extent _____
   Remarks _____

B. Benches — Applicable — (N/A)

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** — Location shown on site map — N/A or okay
   Remarks _____

2. **Bench Breached** — Location shown on site map — N/A or okay
   Remarks _____

3. **Bench Overtopped** — Location shown on site map — N/A or okay
   Remarks _____

C. Letdown Channels — Applicable — (N/A)

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** — Location shown on site map — No evidence of settlement
   Areal extent _____ Depth _____
   Remarks _____

2. **Material Degradation** — Location shown on site map — No evidence of degradation
   Material type _____ Areal extent _____
   Remarks _____

3. **Erosion** — Location shown on site map — No evidence of erosion
   Areal extent _____ Depth _____
   Remarks _____

4. **Undercutting** Location shown on site map No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ No obstructions
Location shown on site map Areal extent_____
Size_____
Remarks_____

6. **Excessive Vegetative Growth** Type_____
No evidence of excessive growth
Vegetation in channels does not obstruct flow
Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations Applicable N/A

1. **Gas Vents** Active Passive
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance
N/A
Remarks_____

2. **Gas Monitoring Probes**
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____

4. **Leachate Extraction Wells**
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____

5. **Settlement Monuments** Located Routinely surveyed N/A
Remarks_____

E. Gas Collection and Treatment Applicable (N/A)

1. **Gas Treatment Facilities**
   Flaring Thermal destruction Collection for reuse
   Good condition Needs Maintenance
   Remarks_____

2. **Gas Collection Wells, Manifolds and Piping**
   Good condition Needs Maintenance
   Remarks_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   Good condition Needs Maintenance N/A
   Remarks_____

F. Cover Drainage Layer Applicable (N/A)

1. **Outlet Pipes Inspected** Functioning N/A
   Remarks_____

2. **Outlet Rock Inspected** Functioning N/A
   Remarks_____

G. Detention/Sedimentation Ponds Applicable (N/A)

1. **Siltation** Areal extent_____ Depth_____ N/A
   Siltation not evident
   Remarks_____

2. **Erosion** Areal extent_____ Depth_____
   Erosion not evident
   Remarks_____

3. **Outlet Works** Functioning N/A
   Remarks_____

4. **Dam** Functioning N/A
   Remarks_____

H. Retaining Walls Applicable (N/A)

1. **Deformations** Location shown on site map Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____

2. **Degradation** Location shown on site map Degradation not evident
   Remarks_____

I. Perimeter Ditches/Off-Site Discharge Applicable (N/A)

1. **Siltation** Location shown on site map Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Vegetative Growth** Location shown on site map N/A
   Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____

3. **Erosion** Location shown on site map Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Discharge Structure** Functioning N/A
   Remarks_____

VIII. VERTICAL BARRIER WALLS Applicable (N/A)

1. **Settlement** Location shown on site map Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Performance Monitoring** Type of monitoring_____
   Performance not monitored
   Frequency_____ Evidence of breaching
   Head differential_____
   Remarks_____

IX. GROUNDWATER/SURFACE WATER REMEDIES Applicable N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines Applicable N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   Good condition All required wells properly operating Needs Maintenance N/A
   Remarks_____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   Good condition Needs Maintenance
   Remarks_____

3. **Spare Parts and Equipment**
   Readily available Good condition Requires upgrade Needs to be provided
   Remarks_____

B. Surface Water Collection Structures, Pumps, and Pipelines Applicable N/A

1. **Collection Structures, Pumps, and Electrical**
   Good condition Needs Maintenance
   Remarks_____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   Good condition Needs Maintenance
   Remarks_____

3. **Spare Parts and Equipment**
   Readily available Good condition Requires upgrade Needs to be provided
   Remarks_____

C. Treatment System Applicable N/A

1. **Treatment Train** (Check components that apply)
   Metals removal Oil/water separation Bioremediation
   Air stripping Carbon adsorbers
   Filters_____
   Additive (*e.g.*, chelation agent, flocculent)_____
   Others_____
   Good condition Needs Maintenance
   Sampling ports properly marked and functional
   Sampling/maintenance log displayed and up to date
   Equipment properly identified
   Quantity of groundwater treated annually_____
   Quantity of surface water treated annually_____
   Remarks_____

2. **Electrical Enclosures and Panels** (properly rated and functional)
   N/A Good condition Needs Maintenance
   Remarks_____

3. **Tanks, Vaults, Storage Vessels**
   N/A Good condition Proper secondary containment Needs Maintenance
   Remarks_____

4. **Discharge Structure and Appurtenances**
   N/A Good condition Needs Maintenance
   Remarks_____

5. **Treatment Building(s)**
   N/A Good condition (esp. roof and doorways) Needs repair
   Chemicals and equipment properly stored
   Remarks_____

6. **Monitoring Wells** (pump and treatment remedy)
   Properly secured/locked Functioning Routinely sampled Good condition
   All required wells located Needs Maintenance N/A
   Remarks_____

D. Monitoring Data

1. Monitoring Data
   Is routinely submitted on time collected ✓ Is of acceptable quality

2. Monitoring data suggests: ~~Groundwater plume is effectively contained~~ - Groundwater plume is not stable. Concentrations are declining, but not appreciably Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

✓Properly secured/locked ✓Functioning ✓Routinely sampled ✓Good condition
✓All required wells located ✓ Needs Maintenance N/A

Remarks Most of the monitoring wells are flush-mounted. Wells that were located are in good condition. Above-ground wells were secured

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The remedy is now consists of MNA. No active remediation systems are operating. The data suggest that MNA is ~~not~~ working, but is not as effective as was hoped. The plume concentrations are generally declining; however, the plume is not stable and is migrating westward toward City of Niles Well field WHPA. The DEE concentrations at leading edge of plume are increasing. ICs are in place, but should be better tracked.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

The O+M generally consists of MNA procedures. The monitoring is conducted semi-annually since 2012. Prior to that, annual monitoring was performed. In addition, geochemical parameters are also being measured during monitoring.

IC should be better monitored and enforced.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

The DEE plume which is migrating Westward + downgradient from the site is not being adequately contained. The plume has breached the sentinel well line. The MDEQ is installing a new line of wells further west of the current line to detect threats to the City of Niles Well-head Protection Areas.

~~The H~~

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

The data collected for MNA suggest that active remediation systems should be explored to be more protective and shorten time to achieve groundwater cleanup goals.

U.S. Aviex Five-Year Review Site Inspection
November 13, 2014

Photo 1 – Facing northwest from Huntly Road, a view of the front gate of the U.S. Aviex Site. The Site perimeter is defined by a six-foot tall cyclone fence topped with barbed wire. An abandoned air sparge point (photo 2) is located to the left of the driveway.

Photo 2 – Abandoned air sparge point located just outside the front perimeter gate. Multiple abandoned sparge points are located just inside the southeast corner of the fence.

U.S. Aviex Five-Year Review Site Inspection
November 13, 2014

Photo 3 – At the Jerry Tyler Memorial Airport off Lake Street. The grassy corner on the right side off the photo is the approximate location of VAS boring RLB-2. RLB-3 is about 700 feet to the west of RLB-2. The beginning of the runway stretch is visible just beyond the mid-ground grassy area.

Photo 4 – From RLB-2 location looking south toward Eagle Street and the Niles water filtration plant area.

U.S. Aviex Five-Year Review Site Inspection
November 13, 2014

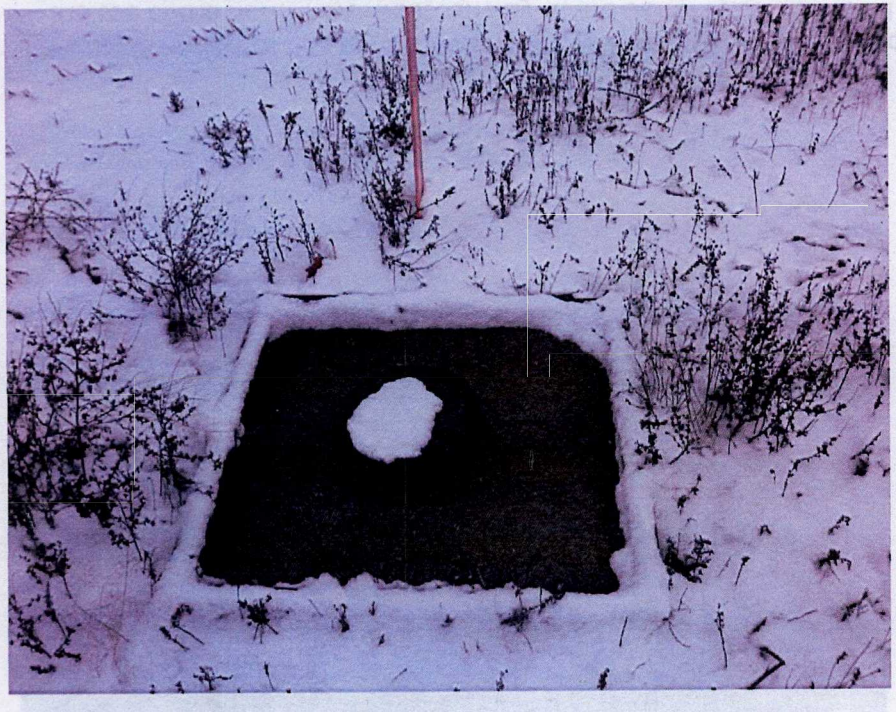


Photo 5 – A close-up view of flush-mounted sentinel monitoring well WMW-10S, located just east of the midpoint of the north/northwest runway.

Photo 6 – A close up view of WMW-10D located directly next to WMW-10S

U.S. Aviex Five-Year Review Site Inspection
November 13, 2014

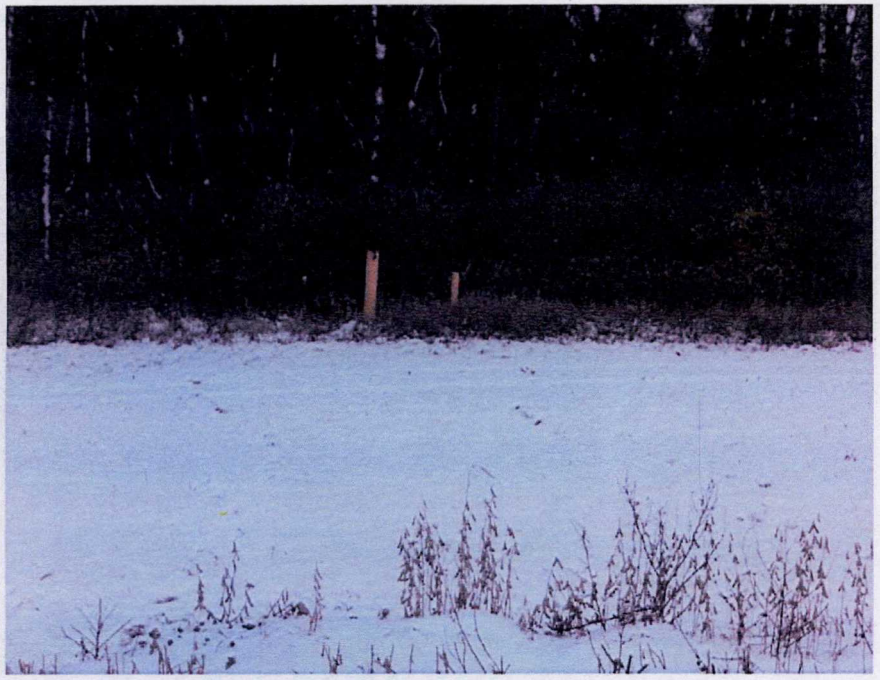


Photo 7 – View of two sentinel wells (WMW-9 and 86-7) located off the toe of the north-northwest runway at the Jerry Tyler Memorial Airport.

Photo 8 – Facing eastward. A close up of sentinel well WMW-9. The well is in good condition and locked.

U.S. Aviex Five-Year Review Site Inspection
November 13, 2014

Photo 9 – Looking eastward, a close-up view of sentinel well 86-7. The well is in good condition and locked.

Photo 10 – View from the toe of the north/northwest runway, looking to the northwest. The airport hangars and associated buildings are visible from the airfield.

Photo 11– Facing westward, a close-up view of the front of the warehouse/storage building located in the back central area of the Site property. The building currently stores boats and RVs.

Photo 12 – Looking westward—the southern side of the storage building is on the right side.

Photo 13 - Close up of monitoring well E-60 in the southwest corner of the property. Well E-40 is located directly south of E-60 by few feet. These wells typify the other flush-mounted monitoring wells installed throughout the Site.

Photo 14 – Facing northeast, a view of the treatment buildings which housed the extraction well pumps and treatment system apparatus. The broken concrete platform in the center foreground supported an air stripping tower.

U.S. Aviex Five-Year Review Site Inspection
November 13, 2014

Photo 15 – Looking directly north, a view of the southwest corner of the storage building.

Photo16– Looking directly eastward. a view of the west wall of the storage building . Monitoring well RL-5 is located about 35 feet west from the building wall and is slightly visible in the mid-ground of the snow-covered area.

U.S. Aviex Five-Year Review Site Inspection
November 13, 2014

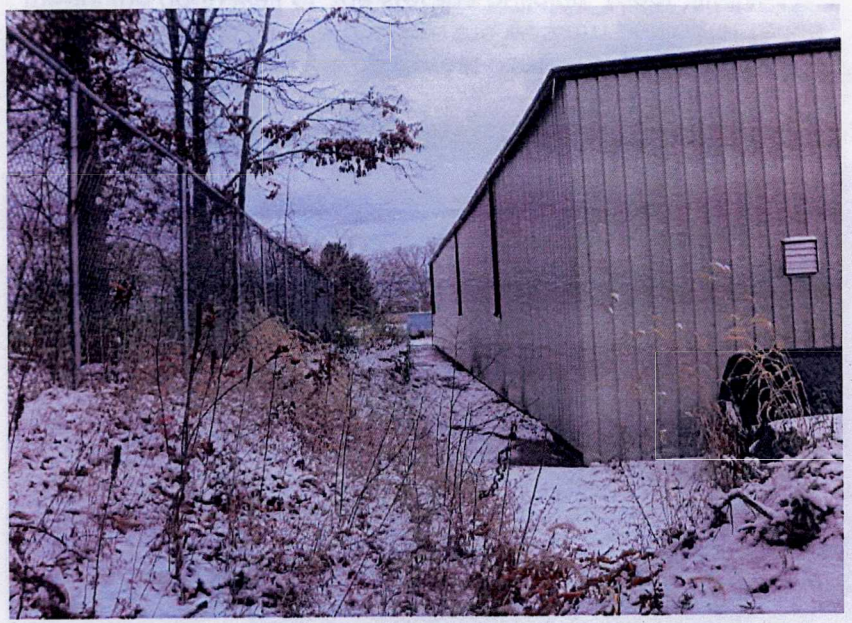


Photo 17 – Looking eastward toward Huntly Road. The Northern wall of the building runs along the right side of the photo, the northern cut-in edge of the property is along the left-side of the photo.

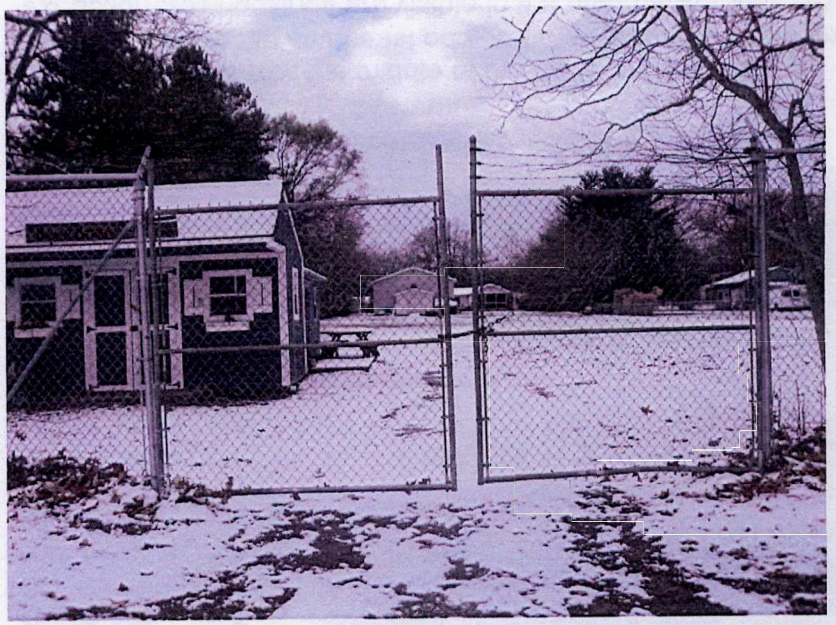


Photo 18 – Gate on the northern segment of the western perimeter fence line. Monitoring wells WMW-1 and WMW-15 roughly define this segment of the fence line. Residential properties are visible on the other side of the fence line.

Photo 19 - View from the northwest corner of the property looking southwest toward where the western perimeter fence meets the north wall of the storage building (near WMW-1).

Photo 20 - View from the middle of the northern perimeter fence looking to the southeast portion of the property. The blue extraction well housings are visible in the near background, and residences are visible in the far background , just beyond the southeastern perimeter fence.

U.S. Aviex Five-Year Review Site Inspection
November 13, 2014

Photo 21 – View from Northeastern corner of the Site property looking to the southwest across the property. The two blue well housing buildings and storage building are visible in the background.

Photo 22 - The Superfund Site identification sign is posted on the front eastern perimeter fence along Huntly Road. Similar signs are posted on the other perimeter fence lines.